

THE IRON AGE

Established 1855

New York, October 15, 1914

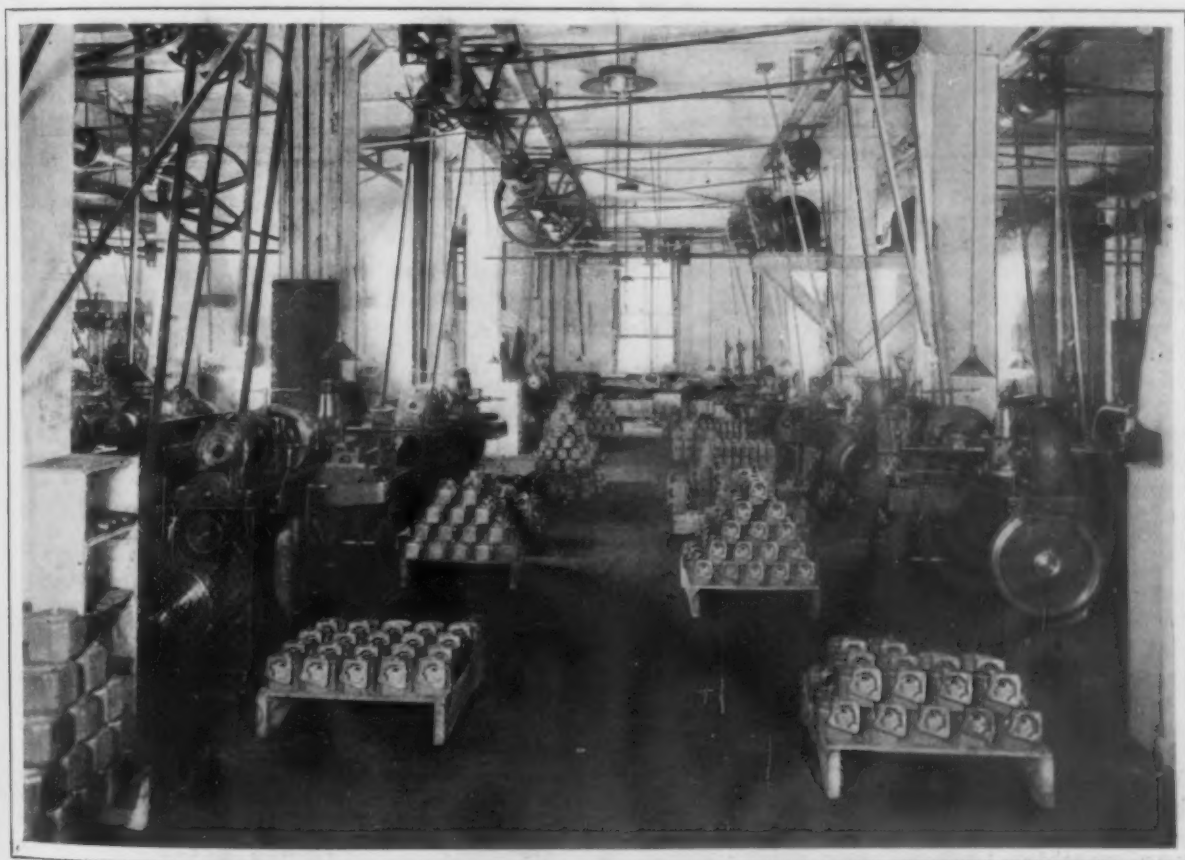
Vol. 94 : No. 16

Manufacturing Electric Starting Outfits

Processes Employed in the Production
of Motor-Generator Sets for Automob-
iles—Use Made of Automatic Machines

One of the important recent developments in the electrical industry has been the general adoption of electric lighting and starting outfits for automobiles. The bulk of the motor cars to be built during the coming season, with the exception of a few of the cheaper makes, will be provided with this equipment. In fact, it is stated that practically every car selling for over \$500 built in 1915

separate, are used, the latter system appearing to be the most common. The generator which supplies the storage batteries is driven from the engine, and the motor for starting the engine is connected to the flywheel by a clutch or sliding gear. As most cars, except the lowest priced, will be provided with a double unit for both starting and lighting, it is estimated that the 1915 output



A Battery of Special Automatic Machines Employed in the Production of Electric Lighting and Starting Outfits for Automobiles. Note the Use Made of Raised Platforms in Conjunction with Elevating Industrial Trucks for Delivering the Work to the Machines and for Piling the Parts After the Machining Has Been Completed

will have an electric starter and electric lights, and it is estimated that of the 1915 output 350,000 cars will have the starting and lighting outfit as standard equipment.

There are different types of equipment for this purpose, in which either the single-unit system, having a combined motor and generator, or the two-unit system, in which the motor and generator are

will require between 600,000 and 700,000 motor and generator units.

For lighting and starting outfits motors and generators of a special type are required that are small, compact, of high efficiency and water and dustproof. To meet these conditions extreme accuracy in machine work is required and the skill of machine-tool builders has been called upon to pro-

vide equipment that will insure the required accuracy in machine work, but which at the same time will enable manufacturers to turn out the outfits in large volume at minimum cost. Special automatic machines have been designed for finishing the castings and forgings, such as motor frames, end bearings, gears and other parts entering into the construction of the electric lighting and starting outfits.

The illustration on page 875 is a view taken in the plant of the Electric Auto Light Company, Toledo, Ohio, and shows a battery of special Potter & Johnson automatic machines used in the manufacture of lighting and starting outfits. These machines have a capacity of finishing the castings and forgings for 700 generators in 10 hr. The upper portion of the illustration on page 876 shows one of these special automatic machines equipped for finishing cast-iron motor frames. The material used in these frames varies with different types of equipment, steel castings, steel tubing and cast iron being most generally used for motor frames. The frame as shown in the illustration has a base which bolts directly on the gas engine crankcase. One end of this frame is cast integral with the frame, differing in this respect from the construction of standard commercial motors, which have separate castings for each end bearing. This complicates the tool equipment for the reason that there are so many surfaces that must be concentric and in alignment, and the highest quality of workmanship is required. The problem of machining this part was solved and the labor cost reduced by making a special arrangement of tools and chucking devices. This was done princi-

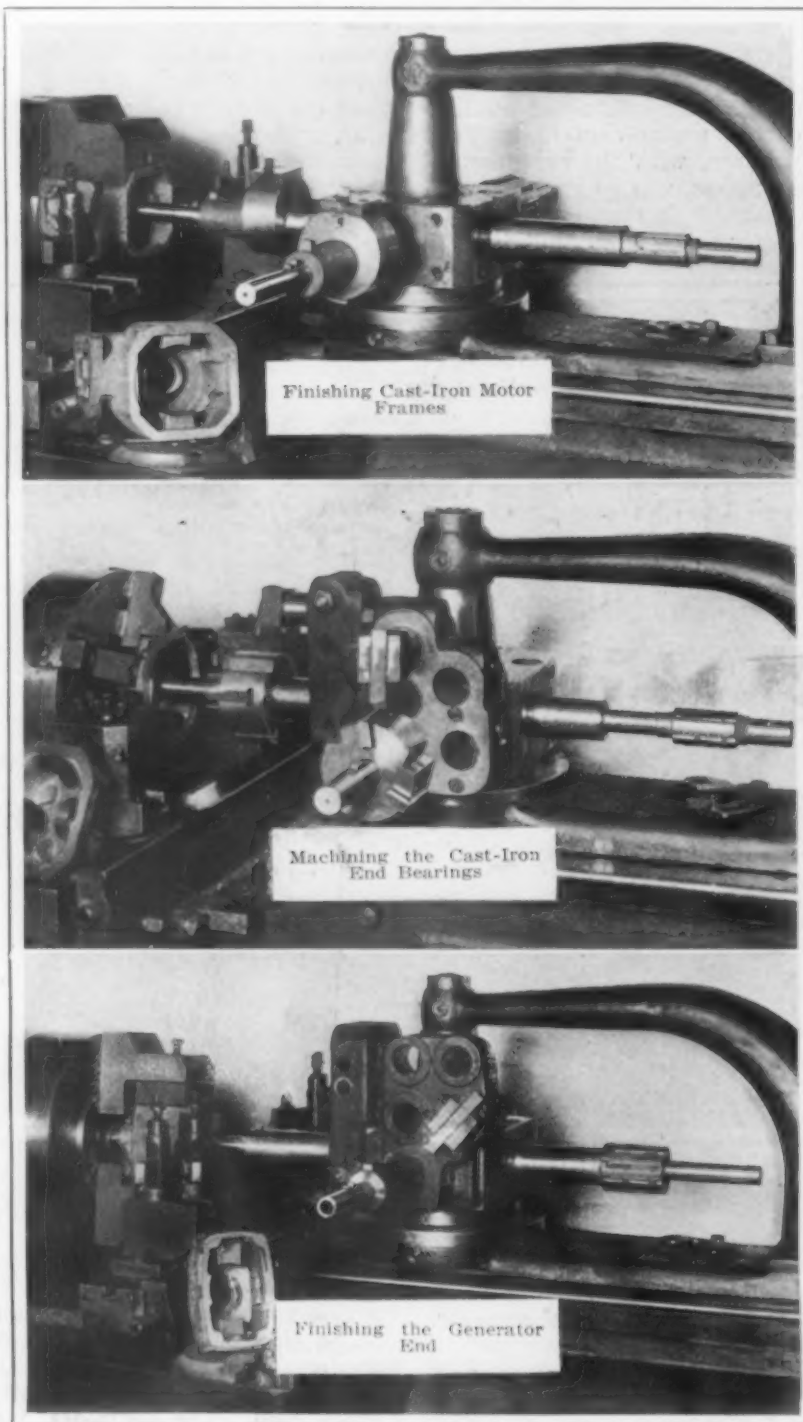
pally by providing tools with multiple cutters and by supporting these in each case with pilots which run in hardened steel bushings in the spindle. This gives assurance that each successive operation of the turret will conform to the previous operation, the tool arrangement being such that the closest limits of accuracy are maintained and there is quick adjustment for wear. The machine used for this and other work shown in the illustrations is a standard No. 6 Potter & Johnson automatic machine provided with the necessary special equipment.

A machine used specially for finishing cast-iron end bearings is shown in the middle portion. The prevailing practice is to make these end bearings from aluminum or cast iron. The arrangement of tools and the method of supporting them is very similar to that in the machine used for machining motor frames. In this machine, however, the cross slide tools are mounted in solid steel blocks which

carry multiple cutting tools. This arrangement permits a quick setting up of the machine or the changing over from one piece to another.

The bottom section shows a machine equipped along the lines of that illustrated at the top, this machine being used for finishing cast-iron generator frames.

Statistics show that only a little more than 3 per cent. of the passenger equipment turned out last year was of wooden construction. In the coming year all postal cars must be steel, according to Government regulation. In the four years ended January 1, 1913, steel passenger coaches increased in number from 629 to 3271, and steel underframe cars from 673 to 3296, each of the former costing about \$13,000. While the first cost means large expenditure for new cars they last longer and there is less damage in accidents.



THREE OF THE OPERATIONS PERFORMED IN THE MANUFACTURE OF ELECTRIC AUTOMOBILE STARTERS

Electric Steel Direct from Ore Fines

The Production of Pig Steel and Castings in a New Furnace in a Canadian Steel Works

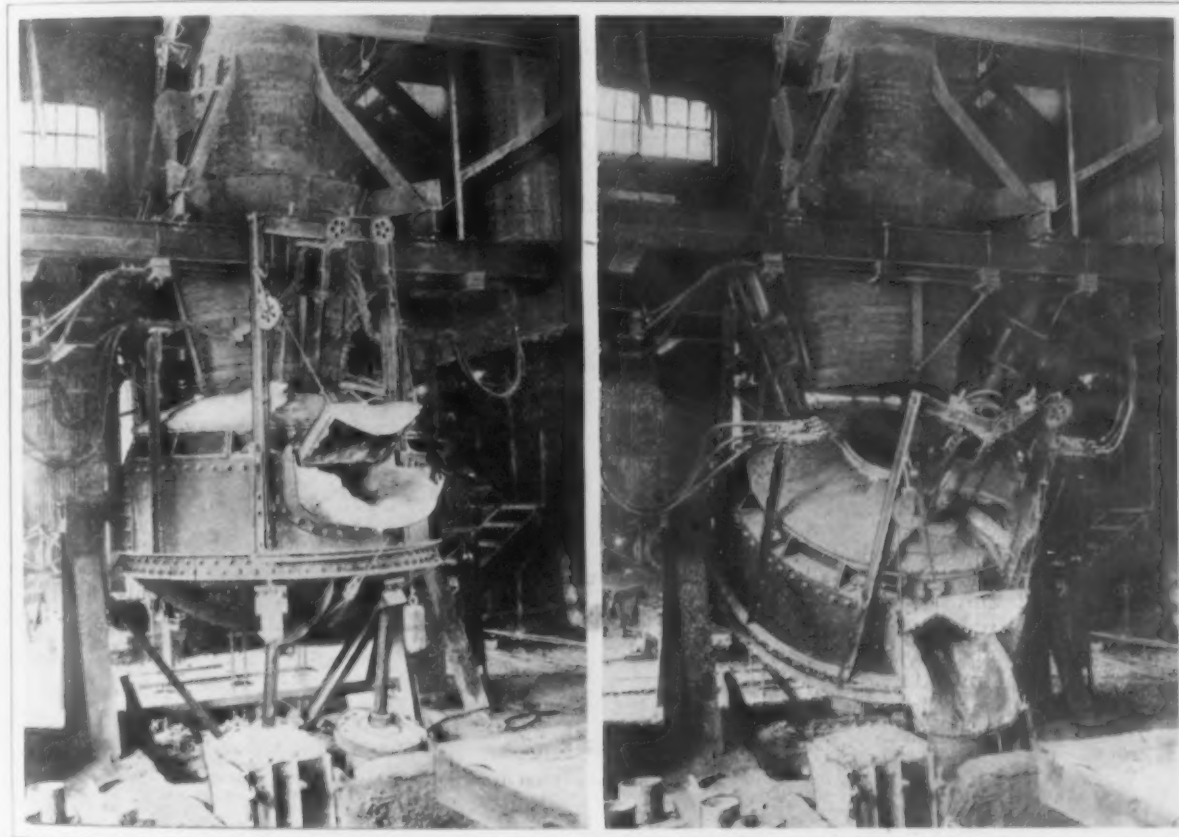
BY A. C. DALTON

The electric furnace is growing of more importance every day in the metallurgical world; its use in the steel foundry has a promising future and its application to the smelting of iron ores is now an everyday occurrence.

Of increasing importance is the application of the electric furnace for the reduction of iron ore into pig steel. To the metallurgist the problem of using low grade ores is one of great and increasing difficulty, since by concentration these ores are usually put into a condition which prohibits their satisfactory use in the blast furnace. Briquetting

Ltd., of Toronto, Canada. James W. Moffat has paid considerable attention to the problem of smelting ore fines, and has designed the furnace now in operation at this plant for reducing these ores for the production of pig steel or for direct production of steel castings or ingots.

It is intended to describe in this article only the process for the manufacture of pig steel, because of the interest aroused in it by Prof. J. W. Richards, Messrs. Lyon & Keeney and other prominent authorities in the metallurgy of iron and steel. We have yet a considerable amount of work before us,



Two Views of the Moffat-Irving Electric Furnace for Making Steel Direct from Ore Fines

the concentrates is expensive and not applicable to all classes of ores, and the cost of it, when added to the mining and transportation charges, makes the ore frequently of little market value.

In localities where cheap electric power and the necessary carbon for reduction are available, it has been hoped that the electric furnace, as it uses no blast, would solve the problem of smelting concentrates and fine ores without briquetting. Through the manufacture of pig steel, it is now possible to smelt successfully ores that were once a waste product of the blast furnace or were too far away from industrial centers to be considered of commercial value. Such conditions exist both in Canada and the United States.

A process that is meeting this situation is that in use at the plant of the Moffat-Irving Steel Works,

but in publishing our results at such an early date, we do so under the pressure of many inquiries concerning the operation of the furnace.

DESCRIPTION OF THE FURNACE

The furnace is a 300-kw. one, of the three-phase type. The current is received at 12,200 volts and is stepped down by a three-phase transformer to 80 volts and is conducted to the furnace (which is quite close) by means of the usual copper busbars and by copper cables clamped on to three electrodes, the clamp connections being water-cooled.

The electrodes are graphite ones, of Acheson manufacture, and are circular in section of $5\frac{1}{8}$ -in. diameter and 40 in. long and are fitted for continuous feed. The electrodes, regulated by hand, enter the furnace at an angle of 65 degrees and are

spaced in a delta formation. Bronze water jackets surround the electrodes where they pass through the roof.

The furnace itself may be divided into three parts: the hearth, the reduction chamber and the stack. The hearth, inclosed in a steel shell, is of the tilting type operated by two hydraulic cylinders under the furnace. The lining is the usual basic lining of magnesite and tar, and magnesia bricks; up to the present no trouble has arisen owing to these bricks spalling. The roof of the furnace is acid and of fireclay brick. The combination of the tilting hearth under a fixed reduction chamber constitutes one of the patents covering this furnace. In the center of the roof is an opening registering with a like one in the reduction chamber, and when tilting the hearth the contact is broken at this junction, which, however, is rendered quite airtight on replacing the furnace.

The reduction chamber, which is of the shape of an inverted cone, is built of firebrick, and opens direct to the stack, where the carbon, ore and flux are fed into the furnace some 13 ft. above the hearth. The ore, carbon and lime are stored in bins at the top of the building, the bins being filled with an endless chain conveyor. From the bottom of these bins the contents are led to hoppers placed at the side of the stack above the reduction chamber. From these hoppers, the materials are separately showered into the hot furnace by means of worm screws, these being controlled by three variable speed cone pulleys driven by a 3-hp. motor. They are so arranged that any single speed may be quickened or slackened independently of the others, thus permitting any desired ratio, or all can be regulated together by changing the speed of the large cone pulley directly connected to the main shaft. Thus it will be seen that there is happily a wide scope for variations of the speeds and ratios.

THE PROCESS

The furnace being hot from a previous run, about 200 lb. of scrap is placed in the furnace to form a ready contact, or a like weight of molten metal is left in the furnace from a previous run, and for a few minutes carbon is charged into the furnace to give a reducing atmosphere. The power is then put on and all the materials are fed into the furnace at the predetermined speeds and ratios per hour. When the charge is clearly melted, the slag is withdrawn by tilting the furnace and the metal poured into a ladle and cast into pigs. The process is simplicity itself, and the charge takes the current so steadily that there is little regulating to be done. The melter, being obliged to give practically no attention to the furnace, keeps his eye upon the working of the materials from the bins to the furnace. Owing to the instantaneous action of the hot gases on the fine particles, we have found that when the weighed charge has been completely and properly fed into the furnace it requires only a very few minutes to melt any small remainder of it still visible on the bath, so completely has the reduction taken place in the shower. The ore used in our work was blast furnace flue dust, which had been concentrated by passing it through a Ball & Norton magnetic separator; 60 per cent. of the concentrates will pass through a 60-mesh screen, and all will pass through a 10-mesh screen. Air slacked lime was used as a flux, and coke breeze for carbon. The materials had the following analyses:

Coke Breeze		Per cent.
Ash	.....	22.00
Sulphur	.....	1.26
Volatile carbon	.....	6.30
Fixed carbon	.....	71.70

Flue Dust

	Per cent.
Silica, SiO ₂	4.80
Ferric oxide, Fe ₂ O ₃	87.36
Ferrous oxide, FeO	3.14
Lime, CaO	0.10
Alumina, Al ₂ O ₃	2.40
Magnesia, MgO	0.20
Manganese oxide, MnO	0.56
Sulphuric acid, SO ₃	0.14
Phosphoric acid, P ₂ O ₅	0.115
Carbon, C	0.82
Loss on ignition	0.20
Metallic iron	63.6

Lime

	Per cent.
Lime, CaO	54.81
Magnesia, MgO	1.01
Silica, SiO ₂	2.08
Phosphoric acid, P ₂ O ₅	0.004

As a basis for our calculations, Grönwall's formula was used:



From this equation our quantities were determined and our speed of charging calculated on the best Swedish practice of 1 lb. of metal per kilowatt hour. Taking them as calculated we used:

Flue dust per 1000 lb. of iron	1572 lb.
Coke dust for reduction	289 lb.
Lime for fluxing	278 lb.

Rate of Feeds

1 lb. of metal per kw-hr., at 250 kw. = 250 lb. of metal per hour into the furnace; 1572 lb. of ore at 393 lb. per hour would take four hours.

Coke—On the above basis 72 lb. per hour was used.
Lime—70 lb. per hour.

In this particular run the materials were all fed into the furnace 20 minutes under the four hours and were all melted except for a small ring round the hearth which when mixed was clearly melted about five minutes afterward. The slag was then poured off and the metal cast into pigs, which gave the following analysis:

Com. carbon	Si.	Mn.	S.	P.
0.02	0.01	Trace	0.131	0.013 per cent.

Another run was made using the same proportions, only the feeds were speeded up to the rate of 1 lb. of metal per $\frac{3}{4}$ kw-hr., or the equivalent to the reduction of 1000 lb. of metal in three hours. This heat was not quite so clearly melted when the ore had been all fed into the furnace, but was completely so inside of the three hours' time. When poured the metal gave the following analysis:

Com. carbon	Si.	Mn.	S.	P.
0.02	0.04	Trace	0.138	0.017 per cent.

Referring to the analyses of the materials charged, it will be noticed that the flue dust is low in sulphur and that the coke is high. The coke introduces 77.3 per cent. of all the sulphur entering the furnace, or nearly four-fifths. Had charcoal been used instead, the sulphur would have been reduced to about 0.03 per cent. in the pig steel. With this one exception, it will be seen that the metal is of such purity that it is ready for recarburizing and the alloy additions. The reduction of the ore depends upon a rich supply of CO, as the ore is never in contact with the solid carbon. The reactions which take place are rather complex and probably of a double nature. The gas problem, while not having received the immediate attention of Mr. Moffat, has not been overlooked and arrangements are being made to allow air to enter at the top of the reduction chamber to burn the escaping waste gas for the purpose of preheating the ore while being showered through the upper stack.

The success of this process opens a new field in the use of low grade ore after concentration without the further expense of briquetting. This type of furnace will be a natural adjunct of the blast furnace as it will enable all the lump ore to be saved for the blast furnace, while the fines from

the calcining kilns and the flue dust may be used for the production of either pig steel or be made direct into steel castings.

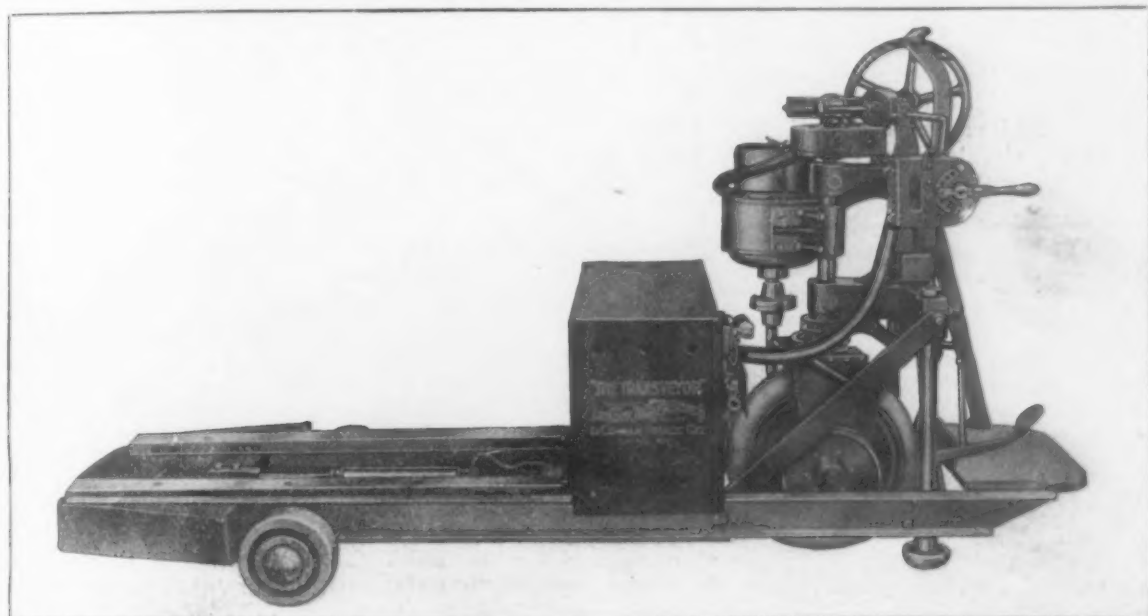
ADVANTAGES OF THE PROCESS

Some of the commercial advantages claimed for the process are: It uses concentrates, fines, or sands direct, without admixture with lump ores; the cost of nodulizing or briquetting the ore fines is dispensed with; the purifying of the ore charged (which can now be freely concentrated) reduces the amount of flux required, and thus makes a larger furnace output of metal possible; it is cheaper to take impurities out of the ores by a crushing and concentrating process costing 25c. to 50c. per ton of crude ore than it is with a process where the electric heat costs \$7 to \$20 per ton, and the cost of furnace product is materially reduced; in the reducing chamber the small particles of carbon are instantaneously acted upon, and during the reduction there can be no danger of explosion by scaffolding; the rate of speed can be altered instantaneously, and the altered rates are

New Storage Battery Elevating Truck

The elevating device of the Cowan Truck Company, Holyoke, Mass., has been adapted to a storage battery truck. In this way an automatic chassis in the multiple platform system now in use in many industrial plants has been provided. In this system all stock or material is piled on wooden platforms or skids as soon as received, and when it is desired to move the material the operator drives his machine underneath the skid and by three or four strokes of the lever at his side elevates the platform 3 in. and locks it in position for transfer to any other portion of the plant. Upon arrival at its destination the load is lowered by pressing a lever and the truck is then ready to pick up another load. It is pointed out that with this arrangement no time is lost in piling material on the truck or removing it.

The truck is mounted on a three-wheel base, which, it is pointed out, enables the operator to make a turn in the length of the machine, which is an advantage in narrow and crowded aisle spaces in factories. The motor is of a special type for standing



A Recently Developed Industrial Elevating Truck Propelled by a Storage Battery and Designed for Use with Sets of Wooden Platforms

immediately effective on the bath itself; the cheaper forms of carbon, such as coke breeze, coal slack and charcoal dust, are used, instead of higher grade qualities; the falling charge does not come into contact with the electrodes; there is no freezing of any descending charge to the walls, should the electric power unexpectedly fail.

Apparatus for Testing the Purity of Oxygen

For use in industrial plants using a large amount of oxygen where it is desired to maintain a certain standard of purity, the International Oxygen Company, 115 Broadway, New York City, has developed a portable testing apparatus. The method of testing consists of the absorption of oxygen by copper in the presence of a solution of ammonia and ammonium carbonate and the removal of the cuprous oxide formed in the process by the solution. The construction of the set is simple and is such that the set is self-contained. Only simple and inexpensive glass parts are used, with the result that a portable and economical piece of apparatus is secured. It is possible to measure gas from high pressure holders without, it is emphasized, injuring the apparatus and results within 0.1 per cent. can be secured.

up under hard and continuous service. The power is transmitted from the motor through a worm and worm-wheel having a ratio of 17 to 1. The motor drives the steel worm directly and the wheel with which the worm meshes is of bronze. Three speeds in either direction are provided and the loaded truck is propelled at from 1 to 4 miles per hr.

Safety devices are provided whereby current cannot be admitted to the controller until the operator pushes down the foot treadle, this action releasing the brake and closing the circuit breakers simultaneously. As soon as the pressure is removed from the pedal the brake is set automatically.

In a test of the machine, it was started 20 ft. away from a 2400-lb. load and run under the platform, which was lifted from the floor, transported 80 ft. and placed in position on the floor, after which the truck returned empty to its starting point. The time required for doing this was only 65 sec. In a recent installation one truck displaced 10 men, with a resultant saving of about \$20 per day in wages alone, as compared with an operating expense for the truck, including the interest on the investment of not over \$1, exclusive of the operator's wages.

New Lake Erie Dock Ore Handling Plant

Fifteen-Ton Hulett Machines at Huron, Ohio, Operated Hydraulically Instead of Electrically to Save Initial Expense

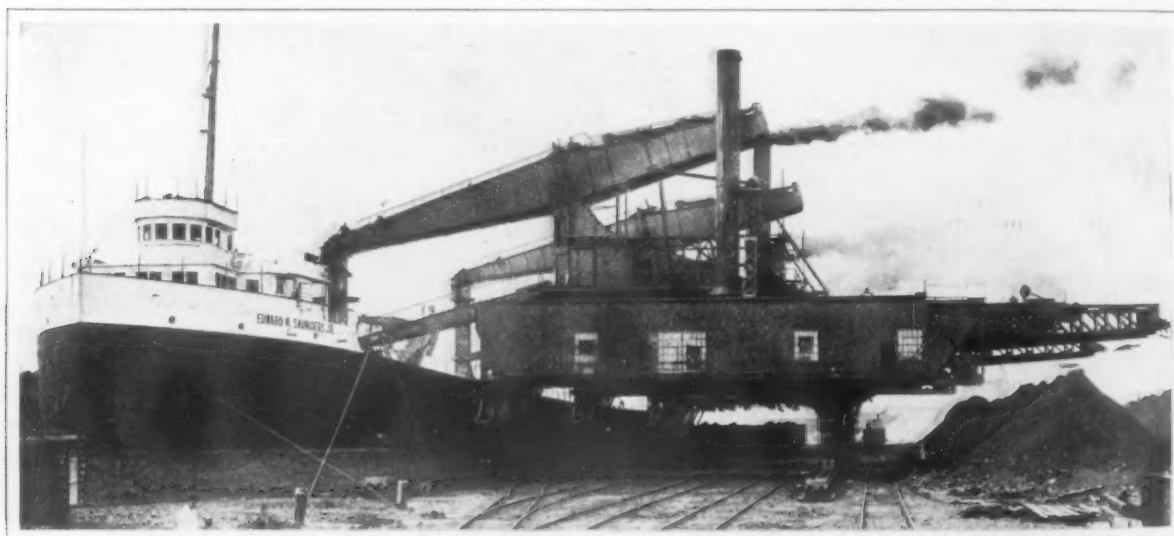
An ore handling plant recently built by the Wellman-Seaver-Morgan Company, Cleveland, Ohio, for the Wheeling & Lake Erie Railroad at Huron, Ohio, is of interest because it is a hydraulic plant, departing from the practice followed for several years in designing plants of this type for electrical operation. The plant is of larger capacity than any of the hydraulic unloaders built a few years ago and represents the highest development in ore unloading machines of the steam-operated type. The plant consists of two Hulett unloaders, each of 15-ton capacity. A steam-operated plant was installed on this dock as a matter of economy, there being no available electric power for operating the machines. While the plant in its general design, apart from being hydraulically instead of electrically operated, is similar to other recently built ore handling plants of the Hulett type, it has some interesting special features to meet the ore handling requirements on this dock.

The unloaders consist essentially of heavy steel framework elevated on gantry legs which are mounted on trucks designed to travel along the run-

unload ore from any of the largest ore-carrying boats on the Great Lakes. Located between the main girders and running on a track extending their entire length is the conveyor car which is used for the purpose of transferring the ore from the bucket into cars or storage, as desired. The conveyor car when at the forward end of its runway is in such position that the ore can be dumped directly into it from the bucket, and the car is then drawn back by ropes to the desired position for dumping.

Power for operating the machine is supplied by a 275-hp. modified locomotive type boiler, which is located in a boiler house at one side of the main girders. This boiler supplies steam for operating the haulage engines for the conveyor car, and also for supplying steam to the pump and water accumulator, and for supplying the operating cylinders which control the motions of the trolley, walking beam, bucket leg and bucket, these motions being hydraulically controlled.

The steam is carried from the boiler to the pump and accumulator by a walking pipe at the



A Recently Completed Installation of Two 15-Ton Hulett Ore Unloaders Which Are Operated by Hydraulic Power Instead of Electricity, There Being No Electric Power Available

way on the dock. The girders of this main framework are extended back of the rear runway so that ore can be discharged under this cantilever to be reclaimed by a bridge spanning the ore storage yard. The main girders of the machine span yard tracks between the front and rear runways, and ore can be discharged from the machine either into cars standing on these tracks or into the temporary storage pile under the cantilever.

Mounted on the main girders and traveling on rails supported by them is a heavy trolley carrying a walking beam from the outer end of which is supported a rigid bucket leg which terminates at the lower end in a Fickinger-Blake patented bucket, having a capacity of 15 tons.

The walking beam supporting the bucket leg is of such length that with the trolley in the forward position and the open bucket shells at the water level, the maximum reach of the machine is approximately 50 ft. 7 in., this reach being sufficient to

side of the trolley. This pipe is supplied with the necessary swivels and is of such length that it will accommodate the extreme travel of the trolley. The main trucks of the machine are 10 in number, five under the forward leg and five under the rear leg. Four of the trucks under each leg are carried in pairs on heavy steel equalizing beams in the sill girders. The fifth truck is carried on springs and is located under the outside girder, supporting one side of the boiler house. Two trucks on the front leg and two on the rear leg are provided with driving gears and connected to the conveyor car haulage engine, which is also used for the purpose of traveling the machine along the dock.

The trolley is mounted on 12 wheels at the forward side and four wheels at the rear side, two of the rear wheels being underrunning on a track provided for this purpose to prevent the uplift at the rear end of the trolley when machine is working at full load. The forward trolley wheels are mounted

on springs in the truck frames. The trolley is moved back and forth on its runways by ropes that are controlled by two hydraulic cylinders of the plunger type provided with a common cross-head in which are mounted sheaves for the trolley rope. The necessary multiplication of parts is obtained by passing these ropes around sheaves carried in the trolley framework and the ends of the rope are secured to each end of the trolley runway.

At the top of the trolley framework are heavy bearings which carry the walking beam trunnions. The walking beam is raised and lowered by a single-plunger type cylinder, provided with a cross-head at the outer end and in this cross-head are mounted sheaves around which the beam hoist ropes are passed, the ends of the rope being attached to the rear end of the trolley framework. The outer end of the walking beam is out of balance to such an extent that the bucket leg descends by gravity.

The bucket leg is mounted on a swivel bearing carried on trunnions in the forward end of the walking beam, this swivel being arranged so that the bucket leg can be rotated three-fourths of a revolution either way from the central position. This rotation is controlled by ropes operated by a double cylinder of the plunger type, which is located at the rear on the top of the walking beam. The rotation of the bucket leg enables the operator to turn the bucket in any position to facilitate the unloading of ore from the boat.

The bucket at the lower end of the leg is operated by cylinders located in the bucket leg. All the motions of the bucket, walking beam and trolley are controlled by the operator who is stationed in the bucket leg directly over the bucket. Convenient to this position are located the pilot valves for operating the main valves controlling the various operating cylinders. The water for operating these machines is supplied by a Worthington compound-pressure type pump, which supplies water to a steam-hydraulic accumulator located at the rear of the trolley. The capacity of this pump is ample to supply water to all of the cylinders in sufficient quantity to operate the machine at its maximum speeds. In addition to the operator in the bucket a second operator is required who has control of the conveyor car and the moving of the machine along the dock.

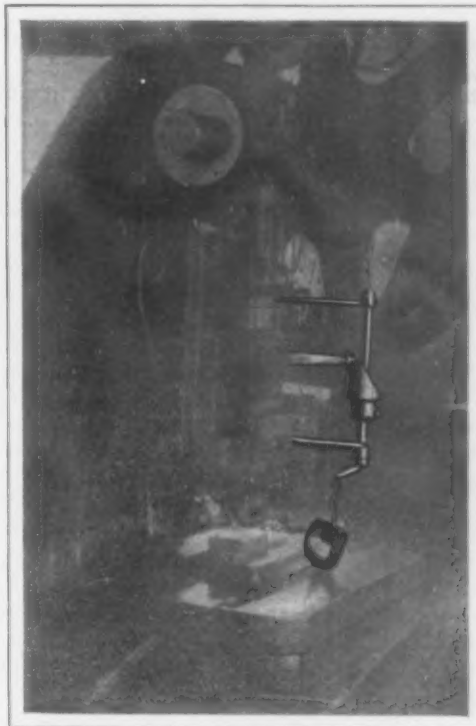
These machines have a guaranteed capacity of 330 tons per hr. for each machine, based on unloading the entire cargo of modern boats. Their capacity for unloading in free ore, however, is very much in excess of the above amount as the capacity of the machine is very materially decreased after the ore has been unloaded to such a point that shoveling is required to clean up the cargo.

The Uehling Instrument Company announces that, in order to keep in closer touch with its customers and clients, its selling connection through the Uehling Sales Company, 95 Liberty street, New York City, was discontinued October 10. All correspondence as well as all orders for Uehling economy apparatus, recorders and supplies should, therefore, be addressed to the main office and works, Uehling Instrument Company, Passaic, N. J.

The Link-Belt Company, of Chicago and Philadelphia, has received an order from the United States Navy Department for four steam-operated revolving locomotive cranes. Three of these cranes will be used at the Philadelphia Navy Yard and the fourth at Charleston, Md. The cranes are all of the company's standard eight-wheel type, with slight modifications to conform with the government specifications.

Safety Device for Hammers and Presses

With a view to decreasing the hazards present in the operation of power presses and drop hammers, the H. C. Hart Mfg. Company, Unionville, Conn., has developed a safety device. It is claimed for the device that it will prevent accidents, as the hand



Device Designed to Render the Operation of Power Presses and Drop Hammers Less Hazardous

operating a power press or drop hammer must be withdrawn out of the danger zone when the machine is in use.

The device consists of a strap resembling a glove with the fingers cut off and an opening for the thumb. A chain is fastened to the top of this strap or glove and extends to a lever on the machine, which in turn is attached to an upright shaft. A reversible cam is mounted on the shaft and bears against a friction roll on the end of an arm attached to the slide of the press. When the press is operated, this friction roll is actuated by the motion of the press slide and causes the cam to revolve, thus drawing the hand of the operator back from the machine.

It is claimed for the device that it does not reduce the productive capacity of the operator. A test made on 10,000 pieces handled with and without a safety device at the maker's factory gave the same results.

The feat of obtaining a vacuum 1 per cent. higher than that theoretically obtainable was accomplished recently in a test made in the hydraulic laboratory of the Wheeler Condenser & Engineering Company, Carteret, N. J. The test was made on one of the company's turbo air pumps and the results showed vacuums higher than the theoretical figures for quantities of air up to about 20 cu. ft. of free air per min. when the vacuum reached the theoretical. This result is explained by the company's engineering department on the hypothesis that the hurling water passing through the pump is subjected to a cooling effect caused by the high vacuum, thus reducing the temperature of the water and the vapor tension, and increasing the obtainable vacuum.

The Duplex Process for Making Steel*

The Equipment and Methods of Operation and Results in Four American Steel Plants, Including One in Canada

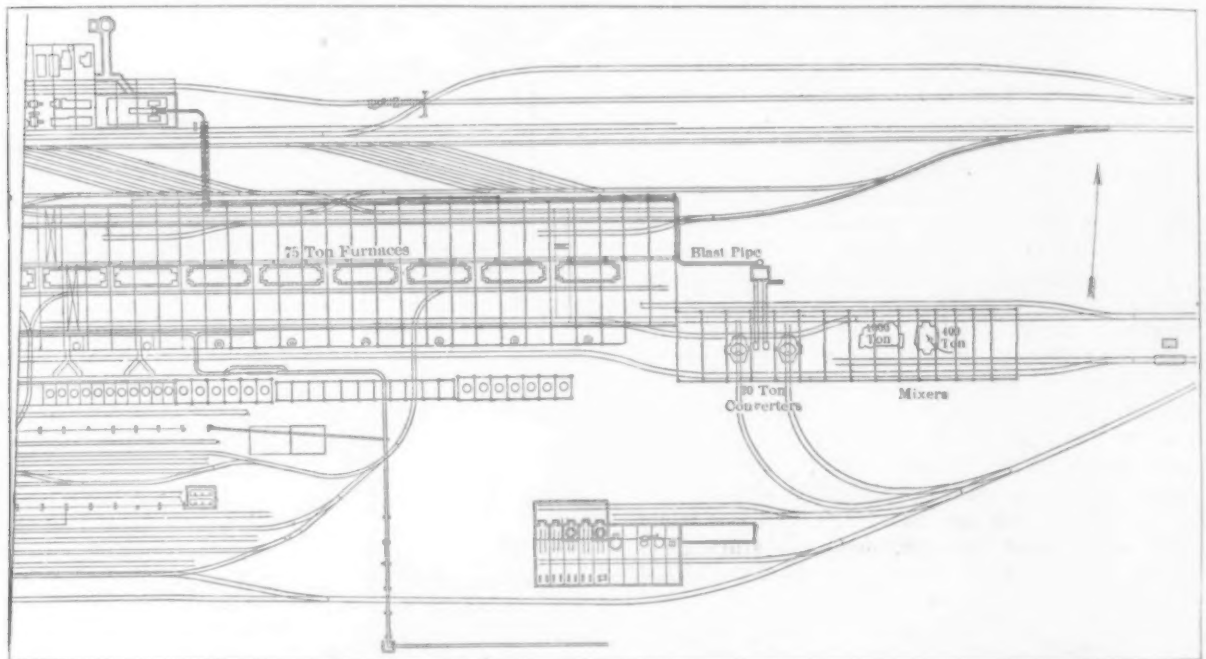
BY J. K. FURST†

The reasons for manufacturing steel by the duplex process are, briefly: saving of time, increasing output for capital invested, and avoiding the difficulty sometimes experienced in obtaining scrap. Some plants duplex only when the price and quantity of scrap in the open market warrant. At some plants the use of the duplex process enables the blast-furnace practice to be simplified, because the furnaces run more smoothly and produce more iron when not held to a strict specification as to silicon and phosphorus.

The duplex process was practiced in Witkowitz as far back as 1878, but it was left to the steel makers of this country to develop it along practical,

was a shortening of the time required in the open-hearth furnace and a reduction of the outlay for fuel and lime. A second duplexing plant, described in *The Iron Age* of May 21, 1908, went into operation in the fall of 1907 and has been operated continuously ever since.

At the time the original 15-ton converter was installed the steel-making plant consisted of six blast furnaces, one 250-ton primary regenerative furnace and eleven 50-ton open-hearth furnaces, of which one was stationary and ten were tilting. The second plant marked the beginning of duplexing in this country on a large scale. All the details were worked out so carefully that practically no changes



Plan of the Duplexing Plant, Saucon Works of Bethlehem Steel Company

commercial lines. The American companies manufacturing steel by the duplex process at the present time are: Tennessee Coal, Iron & Railroad Company, Maryland Steel Company, Bethlehem Steel Company, Pennsylvania Steel Company, Jones & Laughlin Steel Company, Colorado Fuel & Iron Company, Lackawanna Steel Company, Dominion Iron & Steel Company of Canada. All except the Dominion Iron & Steel Company combine the acid Bessemer with the basic open-hearth process, while the latter combines the basic Bessemer with the basic open hearth.

THE TENNESSEE COAL, IRON & RAILROAD PLANT

The installation of a converter of 15 tons capacity at the Ensley plant of the Tennessee Coal, Iron & Railroad Company in 1904 marked the introduction into this country of the duplex system. The experience gained in the employment of the Bessemer converter had demonstrated that there

or improvements have been found necessary, or even desirable, since then. The plant consists of six modern blast furnaces, and two batteries of basic open-hearth furnaces, each consisting of four 100-ton hydraulically tilting furnaces, having hearths 15 ft. wide by 44 ft. 2 in. long. Between the two batteries of open-hearth furnaces, and in line with them, is located the Bessemer building. The converters and the converter-building floor are served by a 100-ton traveling crane. This building houses the two 20-ton converters; one 250-ton and one 600-ton hot-metal mixer; and two 10-ton cupolas for melting scrap, located directly back of the pouring-end of the mixers, with the necessary equipment of troughs so that they can be tapped into the converter-charging ladle which plies between the mixers and converters.

The iron comes from the blast furnaces in 25-ton hot-metal cars, and is poured into the mixers by means of hydraulic lifts. The iron is poured from the mixers into the converter-charging ladle, which travels over a charging floor at an elevation of 14 ft. 7 in. above the open-hearth charging floor. The

*From a paper presented October 9 before the American Institute of Mining Engineers, Pittsburgh.

†Chief engineer, Pennsylvania Engineering Works, New Castle, Pa.

molten iron is charged into the converter by means of a hydraulic post crane. After it has been blown, it is discharged into a 20-ton ladle car and carried directly to the open-hearth furnace.

The distinctive feature of this plant is that the converters are located directly between, and in line with, the two batteries of open-hearth furnaces, thus minimizing the haul of the blown metal. The track over which the blown metal is conveyed to the open-hearth furnaces is located in the open-hearth building, adjacent to the furnaces and between the charging-box track and the furnaces. The ladles are drawn up in front of the furnace doors and the contents poured directly from the ladle, without removing it from the car, into the charging spout. The ladle is tilted by an overhead traveling crane. The converters are located 40 ft. center to center.

Blast is supplied to the converter from an Allis horizontal cross-compound Corliss blowing engine (46 x 88 x 84 in. and 60 x 84 in.) through a 30-in. diameter air line to the 24-in. air valves beneath the pulpit, thence through an 18-in. air line to the blast trunnion of each vessel.

The hot metal coming from the blast furnaces to the mixer is of the following analysis: Silicon, 0.80 to 1.25; phosphorus, 0.9 to 1.0; manganese, 0.3 to 0.4 per cent. In the converter, all of the metal is desiliconized and partly decarbonized. Four ladles of blown metal are required for each open-hearth heat. Ordinarily the first two are blown soft, analyzing: carbon, 0.1; phosphorus, 0.7 to 1.0; manganese, 0.08 per cent.; and the second two ladles are partly decarbonized, the percentage of carbon blown out depending on the amount of scrap charged in the open-hearth furnace. Before the blown metal is poured into the open-hearth furnaces, burnt lime, iron oxide (the latter in the form of scale or ore), and about 15 per cent. of scrap are charged; then the two ladles blown soft are poured in, and lastly the two ladles partly decarbonized, containing 2 per cent. carbon, or slightly more, are added. When the second two ladles are poured into the open-hearth furnace a violent reaction takes place, which transfers practically all of the phosphorus into the slag. It is here that the advantage of the tilting type of open-hearth furnace, over the stationary type, comes in, as at this juncture the furnace is tilted back, allowing the excess slag to run out of the doors into the slag cars beneath the furnace. Recarbonizing of the steel at the end of a heat is not often found necessary, the practice making it possible to catch the carbon on the way down. Ferromanganese is added to the manganese. It took from 1 to 1½ hr. to charge the blown metal into the furnace, and about 1 hr. to finish the heat. Records kept show a variation of 4 to 8 hr. per heat. The time required for blowing the heats in the converters varies, depending on the silicon content, the blast pressure, and other factors. Desiliconizing takes from 2 to 10 min., and decarbonizing from 12 to 20 min.

THE DOMINION IRON & STEEL PLANT

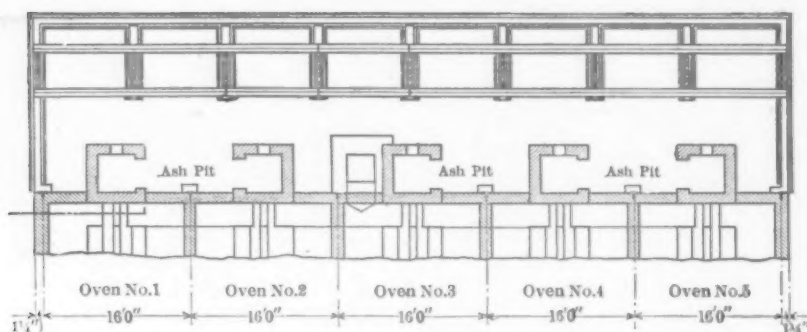
At about the same time the Tennessee Coal, Iron & Railroad Company was considering duplexing on a large scale, the Dominion Iron & Steel Company, at the extreme northern boundary of the steel industry, concluded to install a duplexing plant. The Nova Scotian ores were similar in many respects, but had a higher phosphorus content, and the chief reasons why duplexing was considered advantageous were the long period of time otherwise required in the open hearth, and the difficulty of operating the blast furnaces under a strict specification as to

silicon and phosphorus. Consequently, in July, 1906, the company let the contract for two 15-ton Bessemer converters, with the necessary building and equipment. The first heat was blown in May, 1907.

The vessels were operated for some time with an acid Bessemer lining with very satisfactory results, which, however, seemed short of the maximum possibilities. It was thought that, by operating with a basic lining, better results might be achieved. This was at the time considered somewhat experimental in view of the fact that in Europe, where the basic Bessemer practice was commonly pursued, it was considered that at least 1.75 to 2.25 per cent. phosphorus was necessary. However, the necessary alterations in the bottom house were made, the mica schist lining of the vessels was removed and one of stamped dolomite and tar substituted, and the basic Bessemer process was begun. This method has been in use ever since.

In the year 1910 a third vessel, of the same size and design, was added to the original plant. At this time, the steel-manufacturing department consisted of four blast furnaces, one 300-ton hot-metal mixer, three 15-ton Bessemer converters, two in actual service and one spare, and ten 50-ton basic open-hearth furnaces of the Campbell tilting type. Of the ten open-hearth furnaces, nine are operated according to strict open-hearth practice, furnace No. 1 alone being used in conjunction with the duplex process. Also, there were under construction at this time two blast furnaces and two 500-ton mixers. The mixer building and the converter building are situated between the blast furnaces and the open-hearth plant. The vessels are served by a traveling crane, which operates throughout the full length of the building. The three vessels are arranged in line in the Bessemer building, 36 ft. centers. The tuyere plate of the converters, instead of being of the usual type with 6-in. openings in which refractory tuyeres are placed, is a solid plate provided with 73 ¾-in. tuyere openings. The blast is furnished by the blast-furnace blowing engines through a 36-in. diameter main, 1365 ft. long. The blast is delivered to the vessels at a pressure of 18 to 20 lb.

At this plant the iron coming from the blast furnaces has the following average analysis: Total carbon, 4.25; silicon, 1.00; sulphur, 0.05; phosphorus, 1.50; manganese, 0.20 per cent. From 2600 to 2800 lb. of burned lime is charged into the empty converter, after which is charged about 11 tons of fluid pig iron from the hot-metal mixer. After the metal has been blown, the slag is skimmed into a cast-iron box car made for the purpose, and the metal is then poured into the ladle car, which transports it to the open-hearth furnace, the entire blow consuming from 12 to 15 min. Under good average conditions the blown metal has the following analysis: Carbon, 0.03; phosphorus, 0.07; sulphur, 0.05 per cent.; manganese, none; and the slag is constituted as follows: Silica, 13.0 to 14; alumina, 1.0; lime, 48.0 to 51; magnesia, 2.00 to 4; phosphoric acid, 17.0 to 19; manganese oxide, 1.5; iron protoxide, 13.0 to 15. Five ladles of the blown metal are charged into the open-hearth furnace as they are delivered from the converters, but, prior to this, the open-hearth furnace has been charged with about 4000 lb. of burned lime and 6 to 8 tons of molten iron, direct from the hot-metal mixer, the latter iron being depended upon to give sufficient carbon for the chemical reaction. Ten to twelve heats are made in No. 1 open-hearth furnace in 24 hr. One of the economies resulting from the practice of the basic duplex process is the revenue derived from the Bessemer slag after it has



Plan of Bottom Ovens, Bethlehem Steel Company

been ground and prepared for agricultural purposes.

THE BETHLEHEM STEEL PLANT

In 1910 the Bethlehem Steel Company, desiring to increase and add flexibility to the output of its new Saucon plant and to render itself more independent with respect to the fluctuations of the scrap market, decided to adopt the duplex process, and, consequently, in 1911, a plant was installed. Rather than further burden its own organization, it let the contract to the Pennsylvania Engineering Works for the complete plant. The original Saucon steel works, which were put into operation in 1907, consisted of ten 60-ton stationary open-hearth furnaces and one 250-ton hot-metal mixer, a Gray universal structural mill for rolling wide-flange I-beams and H-column sections, a standard structural shape mill, and a rail mill. In 1913, the Bethlehem Steel Company added to the open-hearth department of the Saucon works, six 75-ton open-hearth furnaces of the stationary type, locating them on the east end of the original open-hearth plant, and added to the mixer capacity one 1000-ton hot-metal mixer of what is known as the German type. The Bessemer converting plant occupies a position east of, adjacent to, and in line with, the open-hearth building, thus making it possible to connect the track for the transport of the blown metal from the converters to the open-hearth department directly with the track in the open-hearth building running parallel with the furnaces, but back of the charging-machine track. We might point out here that the location of the converters with respect to the open-hearth furnaces in this process is of the utmost importance, because the quick and easy transfer of the blown metal is one of the essential factors of success. The output of this department at present, operating on a straight open-hearth basis, is 70,000 to 75,000 tons of ingots monthly. As duplexing is practised only part of the time, it cannot be said just what the output would be if the works were operated continuously under the duplexing method; but actual results have shown that for a given tonnage of steel there is a saving of about 65 per cent. in time.

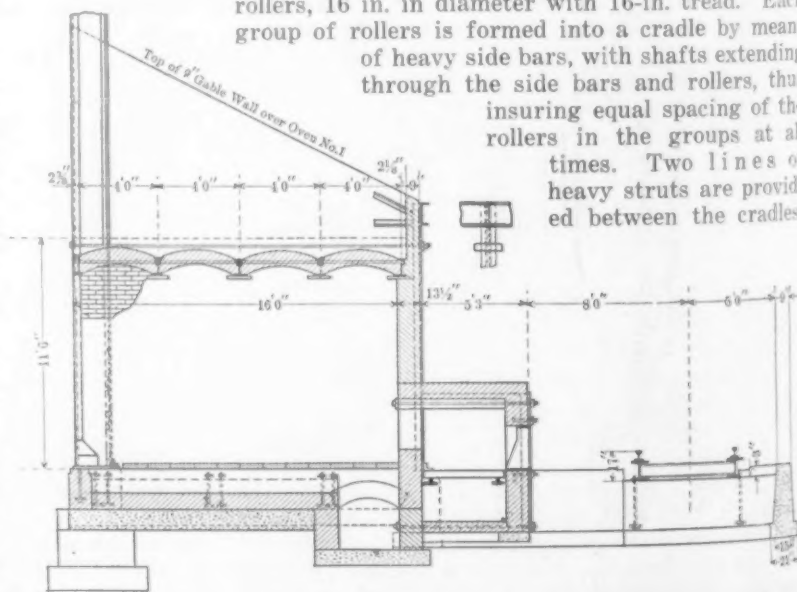
While the mixers have a combined nominal capacity of 1400 gross tons, their actual capacity is considerably in excess thereof, since the larger mixer will hold at least 1200 gross tons of molten iron. The

400-ton mixer is lined throughout, to well above the slag line, with 9-in. thick magnesite brick, backed up by 9 in. of good grade firebrick, while the roof has a 13½-in. lining of furnace-roof brick. The 1000-ton hot-metal mixer is interesting on account of its large capacity as compared to former mixers in this country, 600 tons being the limit of capacity up to that time. The Bethlehem Steel Company stipulated that the builder should send his engineers to Germany

to investigate both the design and method of operation of the large mixers of that country, and the result was that the engineers designed the present mixer after the German type, making such alterations and improvements as were found necessary to meet American conditions. The mixer consists of a cylindrical shell with spherical ends. It is provided with receiving spout on one side and pouring spout on the opposite side. The receiving spout, except when metal is being poured into the mixer, is sealed by a door, which is opened and closed by means of a 7½-hp. electric motor. The pouring spout is closed by means of a number of flat brick arches held in steel stirrups, except a very small opening for the egress of the metal, thus making it possible to conserve from 90 to 96 per cent. of the original heat of the iron charged into the mixer.

In the case of the 400-ton mixer it will be noted that the area of the surface of the metal is large compared with the depth and total volume of the metal, whereas, in the 1000-ton mixer, the area of the surface of the metal is small as compared to the depth and total volume. This feature also has its bearing on the conservation of heat. The 1000-ton mixer is provided with a heating apparatus in which oil, producer, coke-oven or blast-furnace gas is used. It has been found of advantage to use a small amount of artificial heat.

The cylindrical shell of the 1000-ton mixer is provided with four cast-steel bands, spaced uniformly between the two ends. The two outer bands encircle the cylinder about half way, while the two inner bands form a complete circle. These bands serve the dual purpose of reinforcing the shell and supplying tires on which the mixer rotates on the rollers. There are four groups of 11 cast-steel rollers, 16 in. in diameter with 16-in. tread. Each group of rollers is formed into a cradle by means of heavy side bars, with shafts extending through the side bars and rollers, thus insuring equal spacing of the rollers in the groups at all times. Two lines of heavy struts are provided between the cradles,



Section of the Bottom Ovens

to insure the action of all the groups as one unit. The weight of the mixer is transmitted directly from the rollers to 4 heavy cast-iron roller stands, thus producing true roller bearings, and minimizing the friction. With this type of mixer, the center of rotation coincides with the center of gravity, whereas, in the former type, it is necessary to lift the center of gravity about the center of rotation, from which it will easily be seen that the larger type of mixer requires, relatively, considerably less power to operate. In order to insure alignment of the rocker stands, and to tie the mixer more firmly to the foundations, two heavy I-beam girders are provided, extending longitudinally under the rocker stands the full length of the mixer. These girders are provided with shear plates, while the bases of the stands are provided with shear lugs. This feature is also of considerable advantage when lining up the mixer at the time of erection.

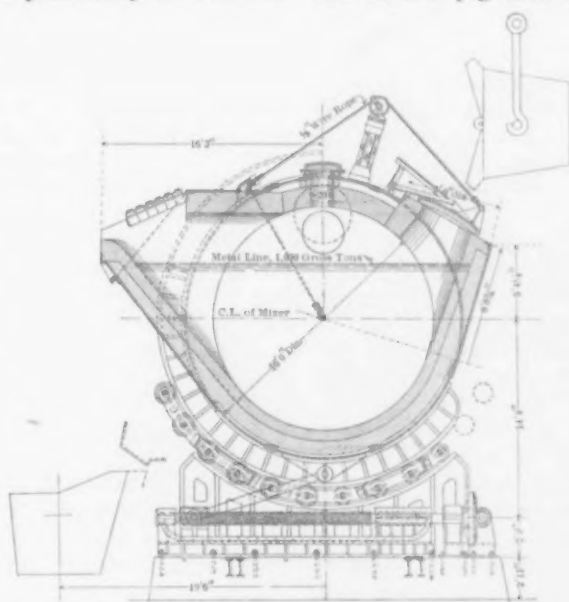
The 1000-ton mixer is operated by two 75-hp. electric motors, either of which is capable of furnishing the required power. The motors are controlled by a magnetic switch-type controller, and are arranged so that they will operate in series during the pouring period and in parallel during the return of the mixer to its normal position, thus reducing the time for pouring and the return of the mixer to a minimum. The motors are placed one at either end of the mixer and are both connected to the line shaft, which is provided with a clutch adjacent to either motor, which may be disengaged in case of accident or for repairs. The mixer has a surface lining 9 in. thick of magnesite firebrick extending well above the slag line, which is backed with 13½ in. of firebrick, which, with the packing between the lining and the shell, makes a total thickness of lining of about 2 ft. The extraordinary thickness of the lining also tends to conserve the heat of the mixer contents.

The blast for blowing the converters is furnished by Southwark horizontal cross-compound engine with barometric condenser, with steam cylinders 46 and 60 x 84 in. and air cylinders 60 x 84 in. The engine is designed to furnish 45,000 cu. ft. of free air per minute, at 30 lb. pressure, and is located in the power house adjacent to the open-hearth plant. The blast is conducted to the converters through a 30-in. main about 500 ft. in length, which is provided with air-relief valve to prevent back pressure to engine. It is also provided with a tank air receiver near the converters to balance the pressure. The air is delivered at a pressure of 18 to 20 lb. from the receiver tank to each converter through an 18-in. air line provided with an 18-in. air valve operated from the pulpit. Heavy steel construction operating floors and platforms are provided about both the mixers and the converters. One 75-ton track scale is provided directly under the pouring spout of each mixer, and another between the converters and the open-hearth furnaces, on which the metal is weighed prior to charging into the converters and again after it has been blown, on its way from the converters to the open-hearth department.

The bottom house is located just south of the mixer-converter building. It has a 16-ft. leanto extending throughout the full length of the building, which is divided into ten equal bays. Five of these bays in the leanto are occupied by the five ovens for drying the bottoms. The ovens have flue connection with a common draft stack, and are heated by firing from the rear with small anthracite coal, for which special grates are provided. Forced draft is furnished by an Eynon & Evans blower on each fire box. The ovens are equipped

with Kinnear roller curtain doors and each one has a floor space of 14 x 16 ft. This house contains a bottom pit, over which the bottoms are made up, a Blake crusher for crushing stone for linings, an 8-ft. wet pan, a 9-ft. dry pan, and the necessary bins and conveyor for handling the raw material. The machinery is driven by a 100-hp. electric motor. There are also ten ladle rests for the repair of the linings of the steel ladles. For lifting the bottoms on and off the cars and bottom pit, handling the ladles, etc., there is provided a 25-ton electric traveling crane. The burned-out bottoms are brought from the converters, and the newly made up bottoms returned to the converters, on hydraulic jack cars.

The method of operation at the Saucon works is practically as follows: The molten pig iron is



1000-ton Hot Metal Mixer, Bethlehem Steel Company

brought from the blast furnaces situated at the Lehigh works, 1½ miles distant, in trains of 40-ton capacity hot-metal cars drawn by the usual standard-gauge locomotive. Just before entering the mixer building, the metal is weighed on a 100-ton capacity track scale. It is then drawn into the building directly opposite the mixers and is poured into the mixers by means of the 75-ton overhead electric traveling crane. The metal is poured from the mixer into a 25-ton capacity ladle car, weighed on the 75-ton track scale placed in the floor directly under the pouring spout of each mixer, and then transported to the converter, where it is charged by means of the overhead traveling crane.

The ladle is of special design with respect to the pouring spout, the object being to retain as much of the slag as possible in the ladle. For this purpose the spout is made so that the metal will pour through a narrow and rather deep opening. The slag is retained in the ladle for several charges and then dumped out. At some plants skimming is resorted to. This is especially true in Germany, where the ladles of metal are skimmed both before pouring into the mixer and before charging into the converter. After the metal has been blown in the converter, it is poured into 25-ton ladle cars (two of which are in constant use for the transfer of metal when duplexing), and transported by an electric locomotive over a standard-gauge track to the open-hearth furnaces. The hot metal is poured by the overhead traveling crane into the furnace, through a portable spout, which is placed in position by the charging machine at time of charging.

Five of the ten 60-ton stationary open-hearth

furnaces are used in the duplexing process. Ordinarily three ladles of converter iron are charged into the open-hearth furnace, one after another, as rapidly as they can be blown. All of the metal is desiliconized in the converter and, of the three ladles of metal constituting the open-hearth furnace charge, the former two have practically all of the carbon eliminated, while, in the last one, about 2 per cent. of carbon is left, to bring about the reaction in the open-hearth furnace. The average open-hearth furnace charge is 40,000 lb. scrap, 15,000 lb. burnt lime, and 95,000 lb. of converter iron. The time required in the open-hearth furnace varies in general practice from 4 to 6 hr., although a single heat has been put through in 3½ hr. At times, recarbonizing is found necessary, and, for this purpose, there is in the open-hearth building a 250-ton hot-metal mixer employed as a receiver for the recarbonizing iron, which is of a special Bessemer quality made from low-phosphorus ores. This metal is poured into ladles, and added to the bath in the open-hearth furnaces, as needed.

THE PENNSYLVANIA STEEL PLANT

The steel-making department of this company, in which duplexing is carried on, consists of six 75-ton and two 200-ton open-hearth furnaces, two 20-ton Bessemer converters, one 300-ton and one 800-ton hot-metal mixer, and a bottom house equipped with the necessary crushing and grinding machinery, drying ovens, etc., for preparing the material, making up, and drying the bottoms. The plant was described in *The Iron Age* of September 10, 1914.

GENERAL REMARKS

The two 20-ton vessels as installed in the plants of the Tennessee Coal, Iron & Railroad Company, the Bethlehem Steel Company, the Jones & Laughlin Steel Company, and the Pennsylvania Steel Company are capable of producing 100,000 tons of blown metal per month. The duplex process has brought about the development of the Bessemer converting plant to a higher state of perfection and efficiency, has created a desire for larger and better hot-metal cars and mixers and has aided those practicing it to solve some of their problems.

Railroads Trying to Advance Commodity Rates

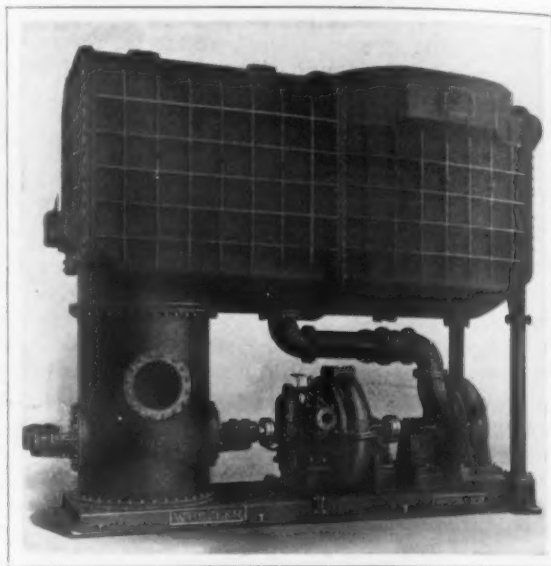
WASHINGTON, D. C., October 14, 1914.—The Interstate Commerce Commission is in receipt of unofficial advices to the effect that substantially all the leading railroad systems west of the Mississippi River will file this month, effective December 1, new tariffs making general advances in commodity freight rates. These filings will constitute part of a movement by all the railroads of the country to put their charges on a basis that, in addition to preventing the threatened default on many securities, will assure their stock and bondholders of a fair return. The first step in the movement referred to was taken October 10, when the Southwestern railroads filed a tariff increasing by 10c. a ton the freight rates on coal, effective December 1. The increase applies upon shipments of coal from points in Arkansas, Oklahoma, Louisiana, Mississippi, New Mexico and Texas to all destinations in the Southwest and South.

Whether the commission is prepared to take the initiative and suspend these tariffs, pending an inquiry as to their reasonableness, appears to be the subject of much speculation among railroad men and large shippers, but this question is not regarded as of much importance in view of the unofficial information received here to the effect that a number of shippers and certain associations thereof have already taken preliminary steps looking to the filing of complaints which will probably result in the suspension of the tariffs pending the usual inquiry.

W. L. C.

A Large Self-Contained Jet Condenser

A rectangular rain-type counter-current jet condenser of large capacity and new design has been supplied by the Wheeler Condenser & Engineering Company, Carteret, N. J., to the city of Seattle, Wash. The auxiliaries, which are turbine driven, are self-contained, and the capacity of the outfit is 97,500 lb. of steam per hr. at a 28½-in. vacuum. The outfit was supplied through C. C. Moore.



A Rain Type Counter-Current Jet Condenser Having Complete Self-Contained Turbine-Driven Auxiliaries. The Capacity of the Apparatus Is 97,500 Lb. of Steam per Hr.

The condenser is of the builder's rain-type counter-current design with the exhaust entrance at the top. In this way it is possible to locate the condenser and the auxiliaries to fit directly underneath the turbines. The tail pump is of the high-speed submerged type for direct drive from the turbine, and the photograph from which the accompanying illustration was made was taken looking into the discharge. The air pump, which is of the same type as the one illustrated in *The Iron Age*, June 12, 1913, is located at the extreme right, and the turbine which drives both the air and tail pump is in the center, this arrangement, it is pointed out, giving a compact and simple unit.

New Steel Buildings at Chicago

Despite the comparative and very marked absence of new business in structural steel, the erection of steel buildings under way at Chicago and in prospect is not entirely discouraging. It is expected that the construction of the new Stratford Hotel at the corner of Michigan and Jackson boulevards, to cost \$4,000,000, will proceed as rapidly as plans can be completed. An eight-story building is planned for Buck & Raynor. The Kimball Piano Company still purposes to go ahead with its 16-story building, at Wabash avenue and Jackson street. On an opposite corner of the same streets, Lyon & Healy will build a similar structure. The 16-story Garland Building, at Wabash avenue and Washington street, is under construction; the McIlvaine Building is being started, and the new Morrison Hotel, the Lumber Exchange Building, the addition to the Borland Block, the new Kaiserhoff Hotel, the Stevens Building and the Conway Building are in process of completion. In addition, plans are being prepared in the offices of Chicago architects for hotels at Dubuque, LaSalle, Milwaukee and Decatur, the aggregate cost of which will approximate \$1,500,000.

Imports of manganese oxide and ore amounted to 19,639 gross tons in August as compared with 28,807 gross tons in July.

VANADIUM STEEL RAILS

Drop, Tensile, Alternating Impact, Bend, Hardness and Wear Tests

Advance information has been given to *The Iron Age* of an extended series of tests of vanadium steel rails compared with tests of carbon steel rails of like section and manufacture. The tests cover the investigation of several heats of basic open-hearth vanadium steel rolled into rails by the Cambria Steel Company for the American Vanadium Company, Pittsburgh, from which company undoubtedly the full report may be soon obtainable. An important conclusion from the test is the recommendation by the American Vanadium Company of following chemical specifications for vanadium steel rails:

Carbon	0.45 to 0.60 per cent.
Manganese	1.00 to 1.25 per cent.
Silicon	over 0.10 per cent.
Phosphorus	not over 0.05 per cent.
Sulphur	not over 0.05 per cent.
Vanadium	4 lb. added per gross ton

This specification, it is explained, will give rails with 30 to 50 per cent. higher elastic limits or useful strength, combined with greater toughness and hardness than simple carbon steel rails with 0.62 to 0.75 per cent. carbon content. It is explained further that the vanadium steel rails show greater superiority in comparison with carbon steel rails of 0.45 to 0.60 per cent. carbon. It is believed that the relatively low percentage of carbon recommended, together with the freedom from segregation of vanadium steel, should result in the practical elimination of the danger of failure from internal fissures.

The tests cover drop tests, tensile tests, alternating impact tests, bend tests, hardness tests and wear tests. In the manufacture of the rails, it was found that no change was required from that followed in the usual practice. There was no tendency for cracking or tearing and in rolling the vanadium steel took the same standard gauges as the simple carbon steel. The chemical composition of the three heats from which the rails were rolled and the production figures are given in the following table:

Heat number	26,813	27,989	27,993
Carbon, per cent.	0.55	0.51	0.558
Manganese, per cent.	1.51	1.11	0.78
Silicon, per cent.	0.17	0.12	0.158
Phosphorus, per cent.	0.015	0.010	0.017
Sulphur, per cent.	0.019	0.029	0.025
Vanadium, per cent.	0.148	0.146	0.156
Actual per cent. vana-			
dium added	0.168	0.16	0.177
Ingot, weight, lb.	121,000	104,400	108,000
Rails, weight, lb.	89,500	79,900	82,000
Rails, number	77—1st & 5—2nd	73—1st & 1—2nd	73—1st & 2—2nd
Rails—scrap	none	none	none
Yield, per cent.	74.0	76.9	75.9

The usual requirement for drop tests was followed, except that the height of the drop was increased from 15 ft. to 18 ft. for the vanadium steel rails, but two rails from the first heat were tested with the height of drop of 15 ft. to get a direct comparison with carbon steel rails. To determine the ductility or stretch after each blow of the drop, six 1-in. spaces were laid off on the bottom of the flange. The tables of the report give in detail the number of drops which each specimen withstood and in detail the elongation of each

of the six divisions. The vanadium rails showed up stiffer under the drop test of carbon steel rails, which were of 0.62 to 0.75 carbon specification; 0.60 to 0.90 per cent. manganese; silicon under 0.20 per cent. and phosphorus under 0.04 per cent.

The tensile test showed an increase in elastic limits or useful strength in favor of the lower carbon vanadium steel without sacrifice of ductility. The bend tests were made on rectangular pieces about 8 in. long. The load was applied 6 in. from the fixed end of the test piece. The radius of the jaw holding the bent specimen was not over $\frac{1}{8}$ in. and the edges of the specimen were not rounded. The alternating impact tests were made on bars turned to $\frac{3}{8}$ in. diameter, and in connection with these tests are given sections of rails to indicate the portions of the rail from which test pieces were taken, so that the conditions of various parts of the rail could be studied. In the impact test the bar was held firmly in a vise and the upper end moved backward and forward by means of a slotted arm to a total distance of $\frac{3}{4}$ in. at the rate of 600 movements per minute. The hardness tests were made by the Brinell method, and readings were taken for 35 different points in the cross section of each rail. The sections from heat 26,813 showed an average hardness of about 340; heat 27,989, about 302; heat 27,993, about 293; the carbon rail A about 248 and carbon rail B about 269. The tests indicated that the vanadium steel rails, although lower in carbon, have greater hardness and hence correspondingly increased resistance to wear.

For securing a wear test, imitating the action of a car wheel on the rail, a piece 1 in. long and 1 in. in diameter was rotated between three manganese steel rollers, 3 in. in diameter. The two bottom rollers were driven by gears with a different number of teeth, to give the rollers different speeds and cause the test piece to slip, as well as to rotate. A load of 110 lb. was applied to the test piece by loading the top roller. In previous tests a load of 220 lb. was applied. Owing to a tendency found with rails like carbon rail A to flow and form a fin or bead, which gave trouble, the weight was reduced to 110 lb. It was found that the abrasion of the test piece was better with this weight than with the heavier load. The test pieces were weighed before and after the test and the loss of weight in milligrams was divided by the original weight to obtain comparative figures. All tests were run for 50,000 revolutions. The relative wear of the vanadium steel rail was found to be practically one-half that of the carbon rails.

Safety First Booklet for Shop Distribution

B. F. Avery & Sons, Louisville, Ky., plow manufacturers employing 1000 men, have recently adopted a plan which has already been put into use with good results to get employees interested in the safety first movement. It is the publication and distribution of a 20-page pocket-size manual or text-book, a copy of which has been placed in the hands of every factory employee. The inside front cover has spaces for the name, address and physical description of the employee and an invitation to employees is given to make suggestions regarding accident prevention and other matters, the company offering cash rewards. The general shop rules and regulations are listed in an attractive way, after which general fire and safety regulations are printed. These rules are followed by remarks on prevention of accidents, individual hazards and then by specific "Rules to Prevent Injury," covering among others bins and shelves, belts, clothing, emery wheels, goggles, etc., some 24 all told. There are also special rules for handling paints and oils.

IRON INDUSTRY IN BRAZIL*

Large High-Grade Ore Deposits, Poor Coal and Transportation and Primitive Methods

BY E. C. HARDER

Few mineral deposits have in recent years attracted such general and widespread attention as the Brazilian iron-ore deposits, due mainly to the quantities of rich ore occurring here, in contrast to the ever-decreasing grade of ores shipped from many large producing iron-ore districts of the world. The most important variety of iron ore in Brazil is hard, dense to specular hematite, occurring in Minas Geraes. Analyses of this ore aver-



The Cross Indicates the General Location of the Minas Geraes Iron-Ore Deposits

age: Iron, 69.65 per cent.; phosphorus, 0.0125 per cent.; silica, 0.24 per cent.; combined water, 0.38 per cent. Several hundred million tons of such ore are in sight, occurring practically on the surface, while besides this rich ore there is an almost incredible amount of lower-grade ores, i.e., ores of 60 per cent. metallic iron and over. It may be found impracticable, when mining operations commence, to mine exclusively the high-grade ores, and that admixtures of other ores will somewhat lower the general quality of marketed material; still it is safe to say that Brazil will be able to furnish for many years ores of Bessemer quality which will average more than 68 per cent. metallic iron.

Up to the present time no iron ore has been exported from Brazil, and only a very insignificant quantity has been used to supply the small domestic furnaces. Plans have been made to ship a small quantity of ore from one of the mines in Minas Geraes during 1915, but it will probably be several years before any important quantities are exported. Conditions are not yet ripe in Brazil for the establishment of an iron-smelting industry of importance within the country. As there is no coal at present known in Brazil fit for smelting purposes, coal would have to be imported from Europe or North

America, and since Brazil cannot afford a market for any great quantity of manufactured articles of iron, it would be necessary to export the greater part of the iron to other countries, thus necessitating double transportation.

The history of the Brazilian iron industry is centered around two regions: Ipanema, in the state of São Paulo, where small deposits of titaniferous magnetite have been operated intermittently since the beginning of the seventeenth century, and Minas Geraes, where the extensive bodies of hematite occur.

DIRECT PROCESS OF IRON MANUFACTURE

There are at the present time about a dozen small plants in the Minas Geraes iron-ore district engaged in manufacturing iron from the ores by the direct process, that is, without the addition of fluxing material. Two types of furnaces are used, the closed or crucible furnace, and the open or Italian furnace. The crucible furnaces are more extensively used. These are generally arranged in series of four, six, or eight. A series of four furnaces will have about the following outside dimensions: 4 ft. high, 5 ft. wide and 10 ft. long. The opening or crucible itself is a vertical, cylindrical cavity about 2 to 3 ft. in depth and about a foot in diameter. From the base of the crucible an opening extends through the front wall through which the bloom is extracted after firing. In the rear wall of the crucible is a small opening which admits the blast, produced by water power.

The smelting operations consist in filling the crucible with successive layers of charcoal and crushed or pulverized iron ore, slightly dampened, then igniting and applying the blast. More ore and charcoal are generally added as the charge settles until a bloom of upward of 25 lb. is produced, the size depending more or less upon the size of the hammer with which it is to be worked. The bloom consists of a mixture of metallic iron, carbon and slag. This mass, in a semi-molten condition, is pounded with a trip hammer, operated by an over-shot water wheel, for the purpose of eliminating the slag. Very frequently it is necessary to reheat and hammer a bar of bloom two or three times in order to make it fairly free from slag, the reheating being done in an ordinary forge.

The Italian furnace differs from the crucible furnace in being open, having only a floor and back wall. In the floor is a hollow or basin into which ore and charcoal are fed and in which the bloom is formed. The blast enters through the rear wall.

An ordinary direct-process furnace will produce about four bars of bloom daily, each 25 lb. and upward, or between 100 and 150 lb. of iron per day. One or two of the existing plants make when in continuous operation nearly a ton of iron per day. As a rule, however, only a limited number of furnaces are operated at the same time. The bars of bloom are later hammered into long, thin wrought iron strips and these are manufactured into horse shoes and various agricultural implements, such as hoes, brush hooks, etc.

Charcoal is usually made of poor wood which remains after the hardwoods and timber resistant to decay have been cut for building and other purposes. The wood remaining after this valuable timber has been removed is usually soft and yields a poor quality of charcoal, which serves the purpose for direct-process smelting but is unsatisfactory for blast-furnace operation.

TRANSPORTATION

For more than 25 years the Central of Brazil Railway, owned and operated by the Brazilian

*From a paper presented before the American Institute of Mining Engineers, Pittsburgh, October 8.

government, has run northward from Rio de Janeiro through the center of the iron-ore district. It is a broad-gauge line (5 ft. 3 in.) from Rio de Janeiro as far as Miguel Burnier in the southern part of the iron-ore district, a distance of about 310 miles, and beyond this point it continues northward with a narrow gauge (1 m. or 3 ft. 3 in.) A broad-gauge line is now being constructed to Bello Horizonte, the capital of Minas Geraes, and this will make a direct broad-gauge connection between Rio de Janeiro and Bello Horizonte.

The Central of Brazil was not planned as an ore-carrying road. Heavy grades and sharp curves abound over large portions of the line. It seems probable, therefore, that by far the greater part of the ore is destined to leave the district by another route, as by the Victoria to Minas Railway. This railroad, now under construction, will tap first those deposits which are now farthest from lines of transportation. The distance to Victoria from the eastern part of the iron-ore district over this route is about 375 miles, the entire distance being on a down grade following the course of the Rio Doce. About 275 miles of the line has been constructed, but the greater part of this will probably need reconstruction since it was not originally planned to make this an ore-carrying road.

At the present time the principal deposits in the eastern part of the district, that is, in the part tributary to the Victoria to Minas Railway, are controlled by English, French and American interests, who have done extensive exploration and development work. In the western part of the district some deposits are in the hands of Brazilians, but here foreign interests, including the German, have made extensive purchases as well and have done much development work. It is from this part of the district that small shipments of ore are expected to be made in 1915 over the Central of Brazil Railway.

LABOR AND WAGES

Wages are low, ranging from about 75c. to \$1.25 per day for ordinary labor and about twice as much for skilled labor, but the difficulty is not only in obtaining laborers but in keeping them. Unsuccessful attempts have been made to import Spanish labor, while recently one of the mining companies imported a number of Japanese laborers. The native Brazilian laborer is averse to working underground and prefers agricultural work with lower wages to mining work. As the iron-mining operations will, however, be largely of the nature of quarrying, there should be less difficulty in obtaining and retaining laborers than is experienced in the gold mines.

"It is gratifying to note that the fatality rate in the metal mines of the United States was lower in 1913 than in 1912," says Albert H. Fay, engineer of the Bureau of Mines, in a technical paper just issued. "The rate was 3.54 per 1000 men employed, against 3.91 for 1912 and 4.19 for 1911. This reduction is to be accounted for largely by the introduction of safety appliances, better supervision and a more strict enforcement of rules and regulations of the mining companies, and a closer observance of the State laws."

The Milwaukee plant of the International Harvester Company, which contains the largest foundry and machine shop of any of that company's works, is now operating at practically normal capacity and the force will be kept intact throughout the winter. This action has been made possible by the unusual number of orders booked and fine prospects ahead by reason of the bumper crop of 1914.

GERMAN STEEL TRADE AND WAR

The Steel Works Union Reviews the Situation

After the regular monthly meeting of the German Steel Works Union, held at Düsseldorf, Germany, September 17, 1914, the following review of the business situation was given out:

Domestic business in semi-finished steel since the outbreak of the war has been quiet. Production, which in the first weeks almost entirely ceased or shrank to only the small quantities necessary for war purposes, has grown somewhat better since freight traffic has been partially resumed. An increase in the volume of sales is not to be counted on for the present since the domestic consumers, though they may be able to keep their plants running, are, generally speaking, cut off from the export market. The advance in price of 12.5 marks (\$2.97) per ton for new business in the third quarter has been reduced to 7.5 marks (\$1.78) per ton for contracts for the fourth quarter. Contracts and production for foreign account have ceased entirely since the beginning of the war.

In July, in heavy structural material, the orders of the state railroads for the year 1915 were placed, which corresponded to the average amounts of recent years. Also the state railroads of Wurtemberg placed orders for a portion of their 1915 requirements. A few large foreign orders were received in July. Production for foreign account was rendered impossible by the establishment of an embargo on the exportation of railroad material. But even after the release of the embargo large shipments cannot be made because of the obstruction to shipping. In light rails contracts with agricultural firms reached for the third quarter the former average total, and the specifications on these in July followed in corresponding manner. With the outbreak of the war foreign shipments ceased as well as domestic because of the stoppage of freight traffic, and it is only since the beginning of September that orders are appearing from domestic consumers as per their contracts.

In July we executed a few large orders for rails, among them a foreign contract several years old, and even in the last few days a fairly large order for rails for neutral territory has been received. The demand for rails, which suddenly ceased at the outbreak of the war, has been in part resumed by the domestic consumers and even for foreign account shipments have already been begun.

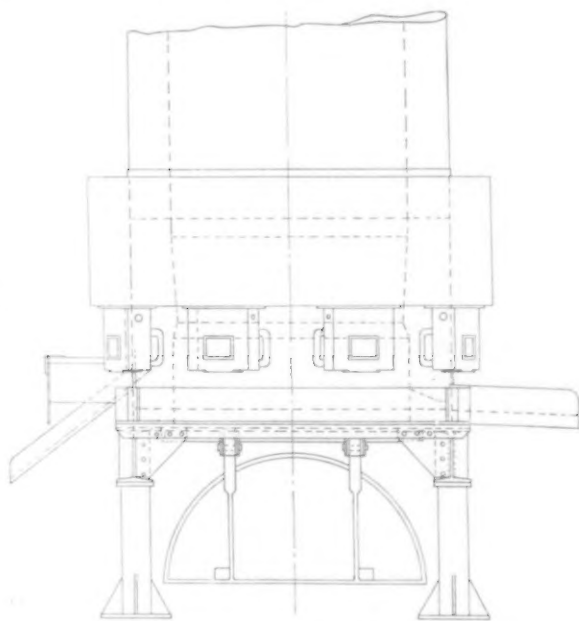
The domestic demand for shapes fell off entirely when war broke out because of the cessation of freight traffic. The Southwest German Works were obliged to shut down, the Rhenish-Westphalian had to suddenly limit their operations decidedly, but only toward the end of August were they able to resume production to cover the current demand by rail in an enlarged territory. Recently railroad demands have fortunately increased with greater regularity. A definite opinion regarding the development of future business cannot be formed immediately. Nevertheless specifications on orders are constantly increasing and everywhere the effort is apparent to overcome, so far as possible, the difficult situation caused by the war. The sale of shapes for domestic account will remain at the former prices until October 31 under a postponement of a fixing of prices until the next principal meeting. Export business ceased entirely with the outbreak of the war. For the present the only way open for foreign business is with neutral lands, and the future will demonstrate whether in spite of the advanced season this will amount to much.

A New Design of Foundry Cupola*

Large Capacity and Long Duration
Heats Two Features—Use of Individual Blast Boxes and a Wind Belt

—BY G. R. BRANDON†—

The development of this new cupola design with the special object of meeting the severe service requirements for large capacity and heats of long duration such as obtain in pipe and wheel foundry practice, and also in implement and machinery foundries of the largest output, has been gradual, the first cupola of this type having been installed in 1908. To increase ease of handling and simplify the construction certain details have been incorporated. The design aims to avoid one of the greatest limitations for hard service in the ordinary construction,



Elevation of a New Type of Heavy Duty Cupola Designed Especially to Meet the Requirements of Pipe, Wheel, Machinery and Implement Foundries

which is the location of the tuyeres all within the windbox. An individual blast box is used for each tuyere, similar to that used in Bessemer cupolas, which greatly simplifies cupola operation. The ordinary construction of windbox which extends to bottom plate also is done away with and a wind belt substituted. Simple attachment of tap and slag spouts to the shell is also desirable in heavy duty cupolas and a design for the base which would be of ample strength and at the same time of simple and reliable construction was considered advisable.

The base consists of a heavy steel plate, square on the outside dimensions and with a circular opening in the middle slightly larger than the inside diameter of the lining. This plate is securely riveted to and supported by two steel H-beams at the front and rear. These beams are supported at the ends with cast-iron cylindrical columns furnished with an ample base flange to rest on a concrete foundation. The top flanges of the columns are machined so as to fit the flanges of the steel beam accurately, and are bolted thereto by bolts of large diameter.

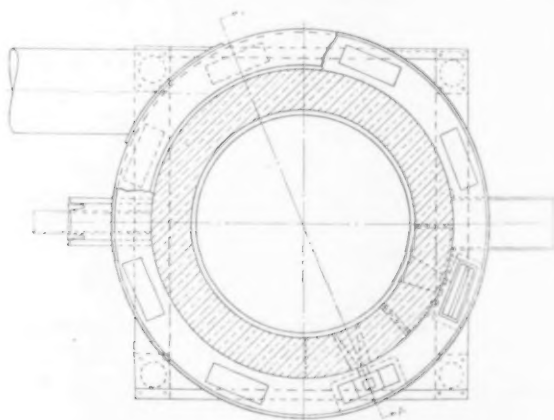
An angle bar is riveted to the unsupported edges

of the bottom plate to give additional stiffness. A heavy angle makes the connection between the bottom plate and shell, and is securely riveted to both. This construction gives great strength, as the circular shell is of such a form as to give maximum strength against buckling from vertical loads or internal pressure and is comparable to a girder of the height of the stack to withstand vertical loads.

The windbox is of belt form with all joints caulked air-tight. The blast entrance is of the tangential type which introduces the air into the windbox with minimum friction.

CONSTRUCTION OF THE BLAST BOXES

The blast boxes are cast iron with flanges for attachment to the shell and the underside of the windbox. These joints are fitted with gaskets and are air-tight. Each blast box has a peephole and cover opposite the tuyere. A frame with a fusible or combustible insert is attached to the underside of each tuyere to serve as a safety device in case slag or metal overflows the tuyere. Each blast box is also furnished with a damper for regulating the amount of air passing from the windbox to the tuyere. The tuyeres are in one row and form a continuous inlet from the shell to the inside of the lining. The tuyere castings are made in segments with a removable top all bolted together through the flanges and are of rigid construction.



A Horizontal Section of the Cupola

The top has a flange at the inner edge, extending upward and inward, and the lining is projected to come flush with inside of the flange. The diameter of the lining at this point is 2 to 3 in. smaller than at the melting zone, to which point the lining is gradually sloped.

The stack is of heavy construction, and all the joints are riveted. Supports are furnished at intervals for the lining and an angle is placed around the top.

Two charging doors are provided, which, when desired, are of the lifting type, operating in vertical guides with counterweights and fitted with an apron attached to the shell to serve in connection with a charging machine. Special doors may be installed for any method of power charging.

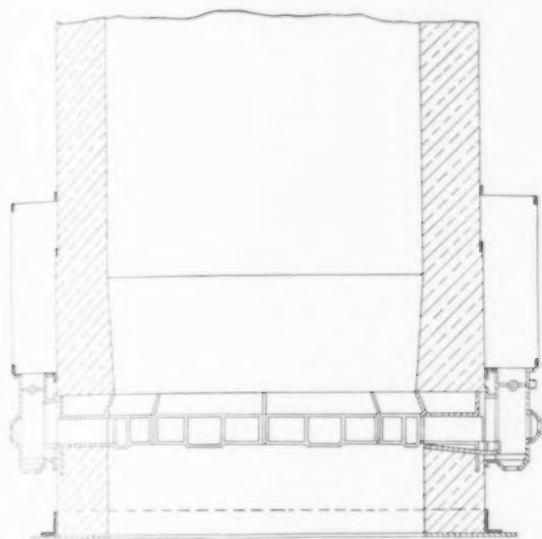
The lining recommended consists of blocks meas-

*From a paper read before the American Foundrymen's Association, Chicago, Ill., September 8, 1914.

†Vice-president and general engineer, Whiting Foundry Equipment Company, Harvey, Ill.

uring 6 x 9 in. and 6 in. thick, forming an inner lining backed by regular square and arch firebrick set edgewise against the shell.

The tuyeres are of such form that it is not necessary for the bricks to fit around individual tuyeres, and the lining is easily laid at this usually difficult



Sectional Elevation Through Opposite Blast Boxes on AA.

point. This saves at least a day's time in relining.

Among the principal advantages of this new construction is the arrangement of the damper in each blast box, which enables the attendant to readily control lighting up and burning through the bed, which must be burnt through evenly before last of the coke is put on and charging is commenced to obtain the best results. Or, in case the cupola is melting badly and great oxidation is taking place at one point, which can be noted at the charging door, the individual blast gate gives the operator a means of overcoming the improper working condition. Also, by proper regulation of the dampers, unequal cutting of the lining is prevented. Another superiority is due to the arrangement of continuous annular tuyeres in combination with liberal size peepholes which permit inspection of practically the whole interior of the cupola and of reaching every part with a poke bar if necessary. The inwardly extending flange on the tuyere cover causes the molten metal and stock to descend clear of the tuyere opening and insures full admission of the blast. The area of the tuyere opening at the inside of the lining is very liberal.

The design of the base with the square bottom plate and columns located at the corners gives clearance for the bottom doors and for the cupola tender in cleaning out the drop and daubing up. With a steel base plate there is less danger of cracking than in the cast-iron construction when water is thrown carelessly on the cupola after dropping the bottom. The simplicity of design also permits the figuring of all stresses with the great facility and the use of ordinary commercial sections insures better workmanship in the shop. The bottom doors have perforated cast plates with deep ribs and heavy hinge lugs, designed specially to equalize shrinkage and withstand heating and cooling. The doors are provided with pads for props and are arranged for the attachment of bottom door hoists. The lugs for the bottom door pins are structural steel and are bolted to the steel bottom plate.

An important feature in large cupolas is the provision for an operator's and tapper's platform of convenient height and substantial construction. This

design of base readily lends itself to this construction. Some features are old, but it is claimed that the combination is new and affords facilities seldom brought together for convenience, safety and efficiency in cupola operation.

Machine Tool Builders' Programme

The official programme of the thirteenth annual convention of the National Machine Tool Builders' Association, to be held at the Hotel Astor, New York, October 22 and 23, is as follows:

First Session, October 22

9 to 10 a. m. Registration of members.

Roll call.

Reading of minutes.

Report of Membership Committee, J. H. Drury, chairman.

Announcement of convention committees:

Auditing Committee.

Resolutions Committee.

Press Committee.

Nominating Committee.

Call for resolutions.

Reports of officers.

Reports of standing committees.

Legislative Committee, C. Walter Wood, chairman.

Catalogue Committee, S. H. Eullard, chairman.

11 a. m. Address, "The Establishment of American Banking Facilities in South America," H. R. Eldridge, vice-president National City Bank, New York.

Open discussion.

Second Session, October 22

2:30 p. m. Address, "Reform in Drawing," E. H. Fish, Worcester, Mass.

Open discussion.

Address, "Waste in Hiring and Discharging Men," Magnus W. Alexander, General Electric Company, Lynn, Mass.

Open discussion.

5 p. m. Executive Session—"Heart to Heart Talks on Trade Conditions."

Third Session, October 23

Friday morning, the Lathe, Sensitive Drilling Machine, Boring Machine, Gear Cutting Machine and Grinding Machine committees will meet in their respective rooms at 9 o'clock; the Hand Screw Machine and Radial Drilling Machine committees at 11:30 o'clock; the Planing Machine and the Milling Machine committees at 11 o'clock and the Shaping Machine, Vertical Drilling Machine and the Turret Lathe committees at 11:30 o'clock.

Fourth Session, October 23

The fourth and final session of the convention will begin at 2:30 o'clock Friday-afternoon and be conducted as follows:

2:30 p. m. Reports of Convention Committees.

Address—"A Closer Commercial Relationship with Latin America," James Logan, United States Envelope Company, Worcester, Mass.

Unfinished business.

Election of officers.

Selection of place of next convention.

Adjournment.

The Bonner Tool Company to Reorganize

The Bonner Tool Company, Champaign, Ill., has furnished a statement regarding its financial condition which is of interest to the trade. Early in the year the company took over the factory of the Danville Car Company, Danville, Ill., intending to make the plant a branch of its operations. Further considerable expense was incurred in experimental work and in the installation of efficiency systems. In meeting such expenses a series of notes was issued which were intended to be discharged through the sale of capital stock, the capitalization having been increased from \$150,000 to \$700,000. About this time the European war broke out, making the marketing of stock practically impossible. The notes having matured and the company being unable to renew them or make payment, a petition in bankruptcy was filed with the United States Court for the protection of all creditors and a receiver was appointed, who was instructed by the court to continue the business. G. W. Cushman, who was appointed receiver, was former factory manager of the C. E. Bonner Mfg. Company and Bonner Tool Company, and is a practical man who has had years of experience in the drop-forged tool business. A plan has been formulated for a reorganization which is expected to place the business on a sound and ample financial basis. The receiver states that no difficulty will be encountered in conducting the business and taking care of the customers. The company manufactures a comprehensive line of drop-forged tools.

American Institute of Mining Engineers

Finishing Temperatures in Rolling Rails —Duplex Process of Making Steel—the Case of the Blast-Furnace Turbo Blower

Among the iron and steel subjects which received most attention at the meeting of the American Institute of Mining Engineers, held in Pittsburgh on October 8, 9 and 10, were the finishing temperatures in rolling steel rails, the duplex process of making steel, the commercial position of the turbo blower in competition with the reciprocating blower for use with the blast furnace and the surface decarbonization of tool steel. There were in all eleven papers presented under the auspices of the Iron and Steel Committee of the Institute, and on Friday and Saturday there were simultaneous meetings in charge of other committees, like the coal and coke committee, among the papers of which was one by J. P. K. Miller, Frick Coke Company, on "The Manufacture of Coke," which is to be reviewed later in these columns. Other sessions were held on non-metallic minerals, petroleum and gas, electricity and miscellaneous mining subjects. A general session was held on Thursday afternoon and the professional sessions of Friday and Saturday were held in the morning, leaving the afternoons open for numerous visits of interest, which included the National Tube Works at McKeesport, the Homestead Works of the Carnegie Steel Company, the Harbison-Walker Refractories Company's works, the experimental coal mine of the United States Bureau of Mines, the testing station of the Bureau of Mines, the oil and gas districts at Oakdale, Pa., and the Stupakoff laboratories. A subscription banquet was held Friday evening and this as well as the meetings in general was well attended and was taken as the particular occasion to voice the sentiment that a decided advance had been taken in the activities and usefulness of the Institute. The following is a brief account of the deliberations of the iron and steel meetings:

The first session, which was one of general interest, was held on Thursday afternoon at the Carnegie Library and Institute. Samuel A. Taylor, consulting engineer, Pittsburgh, presided, and an address of welcome was given by Dr. W. J. Holland, curator of the Carnegie Museum. Among the papers read was one by Lee C. Morganroth, Pittsburgh, on "The Occurrence, Preparation and Use of Magnesite," and one by E. C. Harder, United States Geological Survey, Washington, on "The Iron Industry of Brazil."

SUPPLY OF MAGNESITE FOR FURNACE BOTTOMS

The form of magnesite used in the making of the bottoms of open-hearth furnaces, Mr. Morganroth explained, is that termed dead-burned or so thoroughly calcined that there is no deterioration or reversion on exposure to the air by the absorption of carbon dioxide; in short, it contains less than 1 per cent. of CO_2 . This form is also used for the manufacture of magnesite brick. The crystalline variety of magnesite is used exclusively for this purpose and Austria-Hungary may be said to furnish it all. Continuing he said: "Austro-Hungarian magnesite, on account of its containing chemically combined iron, is much more readily calcined to the dead-burned state. It is also on account of this iron content that it is far more suitable in the making of open-hearth bottoms and in the manufacture of brick, for the iron fusing

causes the magnesite to set. It may be possible to get the same results by using the purer massive magnesite by mixing some iron with it, but dead-burned white massive magnesite cannot compete with the Austrian or Hungarian variety in point of price. A few magnesia brick are made from the massive variety where a brick of special purity is desired or where a more highly refractory brick than one made from the Austrian or Hungarian magnesite is required, as in certain metallurgical processes or in electric furnaces.

"The Austro-Hungarian calcined magnesite received in this country is in the form of grains, ranging in size from particles the size of corn to powder. Approximately 50 to 60 per cent. of the magnesite is used in this form, i. e., is not manufactured into brick, this use being in the making of bottoms of open-hearth steel furnaces. Although the bottoms of the furnaces are made of magnesia brick, the bath is not allowed to come directly in contact with the brick, a bottom of 15 to 20 in. of magnesite grains intervening. This bottom is made by sintering the magnesite grains in place in layers of $\frac{1}{2}$ to 1 in., until the requisite thickness is obtained. From time to time erosions occur in the bottom and along the side walls, which are repaired by putting in more magnesite grains.

"Magnesite bricks are used in electric furnaces, melting, heating, welding furnaces, etc. During the last couple of years the adoption of magnesia brick for linings of copper converters has become almost universal. The United States Government reports a total consumption of magnesite for the year 1912 of 103,000 net tons."

It was brought out in the discussion that though California has magnesite, it was very doubtful in Mr. Morganroth's opinion that it could compete with Austria-Hungary, even with the present increased cost due to advanced ocean freights. He said no shortage was expected, as consumers in this country have several months' supply. It appears that the magnesite around Los Angeles, Cal., exists in veins paper thick to a few inches, and while there was a supply near San Francisco 40 ft. or so in depth, it was miles away from a railroad and even if it were of a higher commercial quality than it is, a similar grade could be obtained cheaper from Greece. In short, the author in his answer to questions made it clear that he considered this country's supply of no commercial importance, at last to the East.

THE CHANCE FOR BRAZILIAN IRON ORE

In the discussion of Mr. Harder's paper, reviewed elsewhere in this issue, Dr. I. C. White, geologist, Morgantown, W. Va., told of his own observations in the regions covered by the paper and emphasized that as no suitable coal existed in Brazil and railroad tariffs were so exceedingly high, coke might better be taken to Brazil. Conditions were otherwise ideal for the manufacture of Bessemer steel. The coal runs 35 per cent. ash and 6 per cent. sulphur, but by washing and briquetting it is possible to get a product of 12 per cent. ash and 0.6 per cent. sulphur. He doubted that the iron of Brazil could be a factor in the life time of the present generation.

Thursday evening was given over to an illustrated address on ancient methods of the manufacture of iron in China by T. T. Read, associate editor of the Mining and Scientific Press, and to a first showing of motion picture lectures on safety methods in mining taken under the auspices of the United States Bureau of Mines. One of these included the operations of the Susquehanna Coal Company at Nanticoke, Pa., and the other the operations of the Witherbee, Sherman & Co. mines at Mineville, N. Y.

FINISHING TEMPERATURES IN ROLLING RAILS

The subject of chief interest at the Friday morning session devoted to iron and steel, held in the School of Applied Industries of the Carnegie Institute of Technology, was the investigation made by the United States Bureau of Standards on the finishing temperatures and properties of rails, discussed in technologic paper No. 38 of the bureau. A résumé of the paper, which was reviewed in *The Iron Age* of October 8, was presented to the meeting under the joint authorship of Dr. George K. Burgess, J. J. Crowe, H. S. Rawdon and R. W. Waltenberg of the bureau. An active discussion both written and oral followed.

Prof. Albert Sauveur, Harvard University, who presided over the session as chairman of the iron and steel committee of the Institute, with Herbert M. Boylston, Cambridge, Mass., as secretary, paid a tribute to the work of the authors and mentioned among other things the uselessness of the present shrinkage clause of rail specifications as emphasized by the paper. R. Trimble, chief-engineer of maintenance of way of the Pennsylvania Lines West, in a written discussion referred briefly to efforts made by railroad engineers to have rails rolled at lower temperatures than permissible under the shrinkage clause with the result that special allowances had to be made in the case of one mill which insisted it could not do so.

W. R. Webster, consulting engineer, Philadelphia, in a written contribution suggested the importance of having the practical mill men consulted. Owing to the section of T rails, the ingot is commonly hotter than is desirable in order to carry the heat through to the final passes, and definite information is needed as to how low in temperature the ingot or the reheated bloom may be taken and also at how low a temperature the rail may be rolled safely, particularly without adding to the web or flanges, and how closely the English bull-head rail may have to be approached. He recalled that he had previously claimed that rolling temperature was fully as important as chemical composition and he was the first to propose the shrinkage clause in rail specifications. More information, he said, is needed of the relation between shrinkage and temperature. The flanges may easily be rolled too cold with hidden tears in the metal and one must go slow on cold rolling unless the rail section is changed.

Dr. P. H. Dudley, consulting engineer for rail, tires and structural steel, New York Central Lines, in a written communication, gave some interesting statistics on the value of anticipating conditions likely to increase rail fractures. He forecasted on September 1, 1913, that the probabilities were the winter of 1914 would not be so mild as the winter of 1913. He sent instructions to have the maintenance of way to its highest standard within 60 days and the equipment as to rotundity of the wheels in 90 days, the conditions to be maintained through the winter. The cold wave was severe in the latter part of January and in February and March, but

the percentage of broken rails and shelled wheels were less than in normal years. There were 13 basic open-hearth rails broken from January 1 to August 1, 1914 (1.93 rails per 100 miles of 80-lb. rails, 0.57 per 100 miles of 100-lb. rails and none of the 105-lb. rails) against 279 Bessemer rails, a ratio of 1 to 22. As regards importance of rolling temperatures, Dr. Dudley holds that the transformations of all the different metallographic forms through which the metal should pass do not necessarily occur in the central portions of the head and checking is likely to occur in the rail straightening process or from the strains in service. One school of theory and practice for the manufacture of rails considers the chemical composition important and has, he says, the backing of two decades of service tests of rails which have proved quite free from breakages in low temperatures. The second school, which believes rails must be rolled cold, is no longer advocating extreme cold rolling, for the service tests have not sustained their contention.

Dr. G. B. Waterhouse, Lackawanna Steel Company, among other things, claimed that though some Bessemer rails were finished 100 deg. hotter than open-hearth rails, there was as a matter of fact very little difference in the shrinkage. In the case of the Bessemer rails there was $6\frac{1}{2}$ in. difference between measurement at hot beds and at hot saws and with the open-hearth rails, a difference of $6\frac{1}{2}$ to $6\frac{3}{8}$ in.

C. H. Wickhorst, American Railway Engineering Association, Chicago, confessed a feeling of elation that rail questions have the interest of the Bureau of Standards. Formerly rail failures were attributed in part to too high finishing temperatures, but that seems not to be true. Some rail failures are due to surface flaws caused by the tearing of ingots in the initial stages of rolling; the ingot surface may seem free from cracks, hidden by scale. He regarded the early stages in rolling as the most important. Not many failures, he said, can be ascribed to rolling temperatures too high or too low, but the time is coming, he suggested, when it will be necessary to ascertain the conditions in this field to get the best results. He asked if there was evidence that large grain size affected wear, or that rail performance is a function of the finishing temperatures or of mill practice in reduction ratios, or of the length of time that the ingot is kept in the pit or the bloom is in the reheating furnace. He concurred that the matter of shrinkage is not a measure of the finishing temperature, and in view of the way the shrinkage is ascertained he mentioned the variable time intervals between the finishing pass and the hot saws and between the saws and the hot beds.

E. F. Kenney, Cambria Steel Company, told of some experiments tending to show that there is no evidence of value in low finishing temperatures. In the Horseshoe curve of the Pennsylvania Railroad rails were installed rolled under different finishing temperatures and no difference in performance of the rails could be detected. Recently on some rails of heavy section the drop test showed no differences between rails rolled at the ordinarily low temperatures and rails rolled even 100 deg. F. lower. He added that even if the mills were assured that the low temperatures were advisable, there were practical difficulties in the way. In the Gautier department of the Cambria works, where the specially smooth finish of that process is obtained by rolling the bars in the finishing passes at low temperature such that heavy scale does not form, it is found that if a complex section, such as of rail is, is rolled, it twists. Moreover the ductility is reduced and generally he doubted if better re-

sults can be obtained by lowering the finishing temperature.

Dr. Leonard Waldo, consulting engineer, New York City, discussed pyrometers at length and took a shy at the drop test for rails, which test he regarded as not at all meeting conditions of a rail in service. He believes the specimen should be subjected to a continuous attack of repeated shocks. What he regarded as a real test of this description he had seen at the Krupp works. He hoped the Bureau of Standards would take up the question. As allied to the problem, he described at some length his method of investigating drill rod steel, which suggested a method of having a specimen of rail suitably supported dropping itself against an anvil so that it is kept in vibration. His investigations with 1-in. drill steel bars 6 in. long, thus struck 8 to 10 times a second, showed incidentally that failure did not occur at the point receiving the brunt of the shock nor necessarily at the nodes of the vibrating bars but at usually unexpected spots where fatigue had nevertheless occurred. Dropping a ton weight a matter of 15 ft. on a rail has, he said, "like the flowers that bloom in the spring, nothing to do with the case."

Dr. Burgess in reply said he would not venture to deal at the time with the considerable amount of helpful criticism. He felt that there was one general trend that no one is able to say at what temperature rails should be rolled. If it is desirable to settle the point, it can, he said, be done. If one may roll with the wide temperature range, then the question is automatically eliminated. He confessed that at first he believed rolling should be done at as low a temperature above the critical temperature as possible, but now he was getting more doubtful.

DUPLEX PROCESS OF MAKING STEEL

Another of the papers of the Friday morning session was on the duplex process of making steel, presented by J. K. Furst, Pennsylvania Engineering Works, describing in some detail the equipment and mill practice of the duplexing plants at the works of the Tennessee Coal, Iron & Railroad Company, the Bethlehem Steel Company, the Pennsylvania Steel Company, and the Dominion Iron & Steel Company. The discussion was entered into by W. McA. Johnson, metallurgist, Hartford, Conn.; Henry D. Hibbard, consulting engineer, Plainfield, N. J.; Secretary Bradley Stoughton and others. Mr. Stoughton explained in answer to direct questions that while the output of the duplex process was not so large as the combined outputs of open-hearth furnaces and Bessemer converters operated separately, it did greatly increase the output of the open-hearth plant per se. The important point was, however, that it makes possible the use of ores which are outside the range of the Bessemer converter. He agreed to an understanding that one duplexing plant was not now in operation, but did not know of two non-operating plants of this class, as was stated by one speaker. He expressed regret that those especially interested and informed concerning the process do not come forward with information.

Papers were presented by Professor Sauveur on "Manganese Steel and the Allotropic Theory" and by John Birkinbine, consulting engineer, Philadelphia, on "The Reserves of Iron Ore in the United States." Dr. Henry M. Howe and Dr. Burgess discussed Professor Sauveur's paper, which had much to do with the controversial point of the existence of beta iron.

TURBO-BLOWERS FOR BLAST FURNACES

The principal interest of the Saturday morning session, devoted to iron and steel subjects, centered

around the paper of Richard H. Rice, General Electric Company, whose paper, "Turbo-Blowers for Blast Furnace Blowing," was reviewed at length in these columns July 23, 1914. The paper covered an investigation of the steadiness in pressure obtainable with a turbo-blower, and included among other things a computation to show the differences in cost of blowing gas engines by means of the turbo-blower, by means of steam-actuated reciprocating blowing engines, and by means of gas-driven blowing engines.

Sterling G. Valentine, superintendent of the Oxford blast furnace, where the first General Electric turbo-blower was installed, wrote in discussion that for 20 months' operation the cost for repairs, packing and other incidentals did not amount to more than \$227.15, and that the cost for the same period for oil, waste, etc., was \$159.22, or a total of 2 mills per ton of iron produced. He said there was a tendency to surge when the furnace was operated at below capacity, but this was overcome by throttling the intake and regulating the governor. He expressed satisfaction with the regularity of the supply of air as indicated in the performance of the furnace, which he had covered in a paper presented earlier before the Institute.

W. McA. Johnson discussed the question from an economic standpoint. He expressed the expectation that the further development of the turbo-blower will result in its lower cost, and that ultimately it will sell at a per-pound basis, and that as air is cheap and power is getting cheaper, while capital is moving in the other direction owing to industrial expansion which demands it, the turbo-blower will appeal to the banker. His expectations were based in part on the developments which have occurred in the case of the steam turbine and the centrifugal pump. L. Iversen, Mesta Machine Company, Pittsburgh, mentioned that the turbo-blower was operated under a pressure regulation, while with the reciprocating blowing engine, all of the air supplied must be passed through the blast furnace.

J. E. Johnson, Jr., consulting engineer, New York City, referring to figures supplied by Mr. Valentine, in the paper mentioned, which indicated the delivery of less air than is theoretically required for the combustion of the coke, explained that Prof. J. W. Richards, Lehigh University, from careful calculations, had concluded that the delivery of the blower must have been 15 per cent. more than stated, basing the figures on the chemical and heat changes transpiring within the furnace. Mr. Johnson said he understood that a turbo-blower at the Iroquois furnaces had an efficiency of 55 per cent., and he was in doubt as to the steadiness of blast obtainable with the turbo-blower. He called attention to the fact that the modern steam engine has not stood still, that the cross-compound reciprocating blowing engine with moderate superheat and vacuum had developed an indicated horse-power on 8½ to 9 lb. of steam per hour, with 95 per cent. volumetric efficiency, for example, and an air horse-power on 10.4 lb. of steam per hour. He figured that 2000 hp. of steam blowing engines at \$60 per horse-power is to be compared with 2500 hp. of turbo-blower capacity at \$50 per horse-power, and mentioned the provision which must be made owing to obsolescence of the turbo-blower resulting from changing designs in a short time. In referring to Mr. Rice's claims for high performance of the turbo-blower at 28 in. and over of vacuum, he referred to the fact that a condenser giving 26 in. of vacuum has only one-third the size of the condenser giving the higher vacuum, and requires only one-third the amount of water. It is difficult to get water in suf-

efficient volume and at a low enough temperature, he continued, to maintain a vacuum of $28\frac{1}{2}$ in., and if such is not maintained the efficiency of the turbo-blower drops. Rather than expecting a decrease of dust with the turbo-blower, he felt that there was indication of the opposite result.

Karl Nibecker, steam engineer, Youngstown Sheet & Tube Company, Youngstown, Ohio, similarly believed that the amount of dust is greater with the turbo-blower than with the reciprocating blowing engine. He, like some of the other speakers, took issue with the calculations submitted by Mr. Rice, for when some of the basic figures are changed in accordance with individual opinion and experience, the comparisons among different forms of blowing engines differ from what Mr. Rice has concluded. Mr. Nibecker reported briefly on some tests made with a turbo-blower and a reciprocating blowing engine with 150 lb. dry saturated steam and a 26-in. vacuum for the engine and 28-in. vacuum for the turbo-blower, in which, with steam meter measurements and measurements of the air by means of the Pitot tube, it was found that there was an equal consumption of power per 1000 cu. ft. of air delivered. With a higher vacuum, therefore, he felt that the engine was better and that after all, in considering the economy of operation, the vacuum becomes a determining factor.

Prof. C. L. W. Trinks, professor of mechanical engineering, Carnegie Institute of Technology, reported briefly on his observations in Europe in a trip ended just before the war. He found that in Germany the turbo-blower was a favorite for spares—that the furnaces could not afford to run them regularly—while in England the turbo-blower was a favorite for blast furnaces, but for air compression for mines it did not stand in such high regard. He explained that in England the ores are lumpy and open, coal is cheap and the furnaces are run at a low rate of driving and at low pressures. He emphasized that comparisons ought not to be made with blowing engines of 10 years or so ago running at the speed of 300 to 400 ft. piston speed and that three blowing engines running at 30 r.p.m. had been displaced by another of the same size, run, however, at 72 r.p.m. He felt that some interested commission should investigate the question, as those who think that the turbo-blower is going to do to the reciprocating engine what the steam turbine did to the steam engine look through colored glasses and overlook two points: that the production of kinetic energy is different from the conversion of velocity into pressure, which is a function of the blowing engine and that the steam turbine is most efficient below low atmospheric pressure and the users of it would like, if it were possible, to get below 30 in. of vacuum. He felt that the leakage factor was also a point to be taken into consideration. In a centrifugal pump there is wear of the packing rings, on account, say, of grit in the water, and with a turbo-blower similar trouble would arise from the grit in the air.

Otto Banner, chief engineer of the turbo-blower department of the Ingersoll-Rand Company, took issue with the statement of the wear in centrifugal pumps and mentioned cases where after 8 years of service the rings in centrifugal pumps were just as tight as when installed. He had never heard of the use of turbo-blowers as spares in Germany. He favored the idea of the investigating commission as fair to builder and user. He described at some length the use of the low-pressure nozzle for measuring air delivery at, say, 20 in. water column, the nozzle having the vena contracta walls and showing

an efficiency of nozzle 10 in. in diameter and above of 99 to $99\frac{1}{2}$ per cent. The Ingersoll-Rand Company has taken up these nozzles and has found a discharge volume from its blowers of 90 per cent., while the indicator card indicated 95, a loss of 5 per cent.

H. S. Braman, superintendent of blast furnaces, Youngstown Sheet & Tube Company, said that his experience so far had been that there was much more flue dirt with the turbo-blower than with the reciprocating blower. With two blast furnaces, using the same percentage of Mesaba ore and practically the same fuel, for one ton of iron 4362 lb. of ore were required with the turbo-blower and 4062 lb. with the reciprocating engine, or 300 lb. of ore more for the turbo-driven furnace than for the other. This ore at, say, 18c. per 100 lb., means 54 cents loss per ton of iron, which for 15,500 tons per month means \$8370 monthly or \$99,000 per year. He thought that with such performance, other economies about which much had been said did not have any special significance. He proposes to run one furnace for 3 months on a reciprocating blowing engine and then the same furnace for 3 months with a turbo-blower. When a shift is made, he noted an evidence of a radical change taking place within the furnace. The furnace is scoured and darkened at the tuyeres. When an engine is running the furnace, the furnace makes dust at times of high pressure, but with a turbo-blower, he said, dust appears all the time.

Mr. Rice, in his closure, mentioned that many are prone to minimize the difficulties of machines long in use in making comparisons with new apparatus. He hastened to call attention to the fact that the General Electric turbo-blower is not governed on the basis of pressure but on volume, and the machine is also provided with adjustments to take care of different conditions of barometer and humidity, securing an accuracy of governing never accomplished before. As to the figures of efficiency for the Iroquois furnace, it is his understanding that no test has yet been made. With regard to the wear of packing, he stated that there is no packing in the turbo-blower, so nothing to wear out on this score. On the other hand, the reciprocating blower must wear, and while the volumetric efficiency may be as high as 90 per cent. at the start, it does not remain so. As regards the use of the turbo-blower as a spare in Germany, he called attention to the fact that the German blowers have only hand regulation. He felt that the development of velocity into pressure applies to the centrifugal pumps, which are admittedly efficient and are replacing reciprocating pumping machinery.

SURFACE DECARBONIZATION OF TOOL STEEL

Another paper which aroused some discussion was read by J. V. Emmons, chief chemist, Cleveland Twist Drill Company, Cleveland, entitled: "Surface Decarbonization of Tool Steel." It showed in a quantitative manner the effect of various treatments in eliminating the carbon in tool steel and took up the problem of the tool steel manufacturer of removing the decarbonized surface before the steel may be used for cutting tools, etc.

Professor Sauveur said he was in very substantial agreement with the author but he expressed surprise that carbon dioxide was just as effective as oxygen. The statement was supported, to be sure, by the results but he wondered if the investigations were extensive enough to justify it. He was surprised also that the core of the steel, although containing the more carbon, was softer than the bark surrounding it and suggested that the excess car-

bon was present, for example, in a globular form. He could not help wishing, he said, to know the best means to prevent the decarburization, although this perhaps might hardly be a fair question. He remarked also that the photomicrographs were of a high degree of excellence.

Bradley Stoughton referred to a recently issued paper of the Iron and Steel Institute by A. M. Portevin, Paris, France, on the "Decarburization of Steels in the Salt Baths Used for Heating Prior to Hardening." High-carbon steel of 0.75 to 1.5 per cent. carbon immersed in potassium chloride at 900 to 1000 deg. C. lost carbon when heated for $\frac{1}{4}$ to 5 hr., and with 10 per cent. potassium cyanide added again carbon was lost from the surface. One experiment covered high-carbon steel and Lancashire iron low in carbon both in the same bath; the iron carbonized and the steel decarbonized.

The author in his reply said that sometimes a

weak carbonizing agent was used in the same space as the steel as a means of preventing decarbonization by preventing access of an oxidizing agent to the steel and sometimes the steel is annealed in carbon monoxide or hydrogen.

Papers were also presented from James C. H. Ferguson, Monadnock building, San Francisco, Cal., entitled "Rolled Steel Roll Shells"; from Harrison Souder, Cornwall Ore Bank Company, Cornwall, Pa., entitled "A New Safety Detonating Fuse," and by Edwin Higgins, United States Bureau of Mines, covering "The Safety Movement in the Lake Superior Iron Region." It is proposed to give some space later to Mr. Ferguson's paper. Mr. Souder's paper was devoted to a detonator consisting of a lead tube 5 to 6 mm. in diameter filled with trinitrotoluene. The duties of presiding at the Saturday morning session were shared by E. Gybbon Spilbury and Henry D. Hibbard.

Prospect for American Machine Tools Abroad

Sales Manager of Allied Machinery Company Comments on Past Selling Practice in Foreign Markets—Outlook Is Promising

Charles E. Carpenter, sales manager of the Allied Machinery Company of America, who returned to this country October 5, in an interview with a representative of *The Iron Age* on the opportunities in Europe which the future holds for American manufacturers of machine tools, gives some constructive criticism of the methods, or lack of methods, with which business has been sought abroad by the average American manufacturer. Many of them, he points out, have the idea that foreign markets are something desirable, yet at the same time they regard them as a great way off—in fact, as more or less ethereal in character—a mental attitude which must be abandoned. The foreign field must be regarded as only an extension of the home market, the difference being that a large body of water intervenes. On this point Mr. Carpenter said:

"The various countries of continental Europe present a great field, one as great, in fact, as the home market, and I fail to see why it should not be worked just as energetically. To some extent this has been done. Indeed, I know of manufacturers whose factories cannot be wholly employed unless they receive substantial orders from abroad. But the average American manufacturer, while believing that the foreign market is a big and desirable field, at the same time regards it as too far away for close attention. At home, salesmen are schooled carefully in all the details and capabilities of the machines they are to sell, are well paid, allowed liberal expenses, and care is taken not to give them too large territories. Abroad most of these precautions are ignored. The manufacturer usually places his products in the hands of parties of whom he knows nothing, except that their financial rating is good. He does not go into the question how far a particular house or its salesmen may be competent to push his product."

That there is to be a far-reaching readjustment of business in Europe, both as to selling and the source of the products consumed, Mr. Carpenter believes to be inevitable. He instances the fact that English manufacturers were doing more and more in France prior to the war and that England's prestige is bound to be greatly enhanced by her present position as an ally of France in that country's time of trouble. The sentiment of Frenchmen, always strong, will increase their gratitude to England.

Some of Mr. Carpenter's constructive criticisms follow:

FOREIGN SALESMEN MUST BE TRAINED

"After American manufacturers have carefully selected foreign agencies they should send competent men to work with the agencies. Good men should be sent to train and coach agencies and their salesmen, and I believe that when this is done good results can be had from almost any live agency. It is difficult to find good foreign salesmen and it would be well, therefore, to train men in this country with a view to sending them abroad, the training to include, of course, at least one foreign language. American salesmen are liked on the other side and speedily become popular. If they are trained men they quickly get the confidence of the foreign manufacturer and he is glad to see them, as he knows that through them he can learn something.

AGENCIES CHANGED TOO OFTEN

"Manufacturers should avoid making too frequent changes in their agency connections on the other side. Many of these arrangements are for one year only, subject to cancellation at the end of ninety days' notice, and I have known them to work out in this manner—the agent gives an order for a number of machines to place in stock. Six months pass before the machine, and the literature in the language of the country concerned, are delivered. Now, it is well known that it is several months before a salesman new to the line is what I call 'strong' in selling a product like machinery, and it is extremely likely, under the circumstances mentioned, that little is accomplished in the first year except in an educational way and the laying of a good foundation for future business. Toward the end of the first year the manufacturer receives an inquiry from another agency. Then he says to himself: 'Well, this man who represents me hasn't done much and here is an inquiry from another man. I will give him a chance.' He then makes an entirely new arrangement and loses the value of what has been done in the previous year. The situation is intensified by the failure of the American manufacturer to give his foreign representatives sufficient specific details as to just why his machines and their parts are designed as they are. If there is a reason, and, of course, there is, it should be given. As to sending men abroad, certain manufacturers have done this and the results have been most satisfactory. Others have been successful in establishing their own selling forces in Europe, but not

all can do this. It would be too expensive, even for some concerns which might be called large, to establish branches in the various European cities. The demand, while worth serving, is not large enough to justify branch offices. Others prefer to deal with agencies for other reasons."

With reference to competition which has been encountered from German machine tool makers, Mr. Carpenter said:

A CASE OF GERMAN COMPETITION

"Germany has been giving us a hard rub. As a case in point: At an exposition in Paris we proposed to a French manufacturer an American machine for a multiple drilling operation. He was pleased with the machine, satisfied with the reference that was given and had practically decided to place an order with us, when a German manufacturer learned of the case. The German not only offered to sell a similar machine at a lower price, but, against our regular terms, agreed to allow one year for payment. In addition, inasmuch as he had no such machine in operation in France, he paid the buyer's expenses to a factory in Germany where a machine was running. The German manufacturer will go to any length to get business, even to the extent of sacrificing profits, especially when he wants volume. If an American seller names a price of \$10,000, it is a certainty that the German seller will offer to fill the order for \$9000."

Offsetting the foregoing instance, Mr. Carpenter related a case where a big Swiss plant bought a large American machine, despite pressure that a German make should be favored. The manager of the Swiss plant, however, said that he wanted the machine that would deliver the greatest output and this meant the purchase of the American tool. The prices of American machines invariably are higher than those of German make, Mr. Carpenter said; but, all things considered, the American machine was worth the difference and if a buyer is at all reasonable he can be so convinced. He suggested that American manufacturers carefully study conditions in Scandinavia, also, and take the time and trouble to go to Sweden and Norway.

ALLIED MACHINERY COMPANY'S OFFICES

As to the present status of the Allied Machinery Company of America abroad, Mr. Carpenter said that the Brussels office is the only one that is closed. The Paris office is doing a fair amount of business, most of the sales being for delivery to the arsenals of the French government, which are operating night and day. The tools taken have been mostly milling and grinding machines. Of the former 20 were shipped last week, the shipment being made via Havre.

The Zurich office of the company is open, but business there is extremely quiet. The machine tool industry of Switzerland is working only one-third of its men and these only one-half time. The stagnation in Switzerland is augmented by the keeping of 400,000 men on the border. The state of the mail service between Paris and Zurich is shown by the fact that 28 days were required for a letter to reach Zurich from Paris. Shipments to Switzerland have been made by way of Genoa up to the present time, but the sending of goods to Italy is becoming precarious because of the tense situation in that country. Shipments to Switzerland are usually made by way of Antwerp, which is the cheaper route, but this is now out of the question. The Turin office of the company is open, but doing practically no business except in small tools.

In view of the present conditions abroad, the Allied Machinery Company of America, Mr. Carpenter said, will be glad to hear from American manufacturers with a view to following up inquiries they may receive from Europe, wherever it is considered that the war has nullified selling arrangements. The company will continue to offer its services in such cases until matters are readjusted on a new basis.

The Yale & Towne Mfg. Company has secured a new sales location at 77 East Lake street, Chicago, which it will occupy for a term of years. The present location of this company's Chicago office is 74 East Randolph street.

National Council for Industrial Safety

CHICAGO, ILL., October 14, 1914.—(By Telegraph.)

The third annual safety congress of the National Council for Industrial Safety being held at the LaSalle Hotel, Chicago, brought together for the opening session on Tuesday, October 13, nearly 400 safety experts. In the character of the programme offered for consideration, and in the attendance, this movement, still in its pioneering stages, made a remarkable showing.

At the morning session a report by the president, R. W. Campbell, revealed a progress in the development of organized safety work which has hardly been realized by those not directly in touch with the work of the National Council. Fourteen local councils in cities from Kansas City to New York have been organized, and the operation of safety departments has been placed on a practical and efficient basis in a wide variety of industries.

The committee on accident statistics through its chairman, Royal Meeker, of the Bureau of Labor Statistics, reported an agreement upon the essential basis for taking accident statistics. A tentative report covering standards for safety to apply in all industrial plants was submitted for discussion and consideration.

The afternoon session was featured with an address by Miss Ida M. Tarbell, which reflected a viewpoint on the general safety movement outside of the purely technical and expert sphere of the man in the work. It was the more illuminating for this reason. Miss Tarbell pointed out that those who were promoting the work of safety were making of themselves the greatest educators, for the methods they were pursuing were breaking down superstition, were developing the habit of sustained attention, were creating the power of suggestion and were contributing to the ascendancy of that humanitarian viewpoint which insists that progress in world power, in the accumulation of wealth and in the pursuit of culture must not be at the sacrifice of human life.

Large Gas Blowing Engines

The Mesta Machine Company, Pittsburgh, is building for the Pennsylvania Steel Company, Steelton, Pa., two gas blowing engines of 46-in. and 84-in. cylinder diameters and 60-in. stroke. These are believed to be the largest gas blowing engines ever built in this country. The gas cylinders and blowing cylinder are arranged in tandem, the air cylinder being directly back of the gas cylinder. This arrangement has never been used in the United States, but has been largely adopted by European gas engine builders. It makes possible a much simpler design of the whole engine. Another innovation, as far as American gas engines are concerned, is the use of a center crank instead of an overhung crank. While it is possible to build large engines with overhung cranks, it is considered that the center crank provides a more rigid construction. All of the Mesta large reversing engines have been built with center cranks. The blowing tub is equipped with the Mesta automatic plate valve, Iverson patent, which, since its introduction in 1911, has been a success. With these valves the efficiency of the air end is greatly increased and the cost of maintenance and repairs reduced, as all complicated valve gear is eliminated.

The Independent Pneumatic Tool Company, Chicago, Ill., manufacturer of Thor pneumatic tools and electric drills, has appointed V. W. Robinson its representative in Michigan, with headquarters at Detroit. F. J. Passino, hitherto Michigan representative of the company, has been appointed its representative in the Southwest to succeed H. F. Finney, promoted to a position in the general sales office in Chicago.

The A. Klauber & Sons Iron & Metal Company, St. Louis, has been incorporated with a capital stock of \$20,000 by Daniel W. Klauber, John Klauber and William Klauber to take over a business hitherto operated as a partnership and which has dealt in scrap metals of all kinds.

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Business Prospects

An outstanding fact is that a surprising proportion of the predictions as to war's effects, made within the first two or three weeks of war, have proved entirely wrong. The advance in pig tin to more than double price, when there existed in the country stocks sufficient for many weeks of consumption, was a prediction that there would be a prolonged famine. The advance in spelter of more than a cent a pound was a prediction that Great Britain would require so much as to make it difficult for us to meet the requirements. The advance in ferromanganese to four prices was a prediction that there would not be enough of the alloy to make the steel needed. Even in August, the first month of the war, our iron and steel imports were 14 per cent. greater than in July. It was predicted early that there would immediately be a very heavy export demand for steel, whereas in the third month of the war the export demand hardly represents a total as great as the average for a few months preceding the war. On the other hand, it was thought that export shipments were almost wholly shut off during August, yet the Government statistics show that iron and steel exports of lines reported in tons were only 25 per cent. less for that month than in July. About the middle of August there was a perceptible buying movement of steel products by some interests, traceable to fears that sufficient supplies would not be obtainable later, but such fears were very quickly shown to be entirely unfounded.

Other predictions remain which have not been proved wrong as yet, but the test of them has not come. It is often said these days that one cannot judge the future by precedent, because there are no precedents for this state of war. That is true; but since the war started we have accumulated a good many precedents of predictions that proved wrong, making one very chary of taking stock in any of the predictions now made.

As to iron and steel production, the country finished two months of war conditions with a rate of pig-iron production of some 22,200,000 tons annually, that being the indication of our monthly blast-furnace report, for the rate on October 1, and this is almost 65 per cent. of our capacity, taking the capacity at 35,000,000 tons. Of late predictions have been made that the rate of production would drop to a lower percentage of capacity than had ever before obtained. A summary printed in these

columns a week ago indicated that in the past the extreme drops have been to 50 per cent. for periods of a very few months, and possibly to 40 per cent. for periods of a very few weeks. In view of what little has occurred to date, it seems rather improbable that the old records of decreases in production will be beaten.

As to unfavorable financial developments, the record of the past eleven weeks is certainly much cleaner than was expected in most quarters. Industry has already felt the extreme pinch of the remedies applied, in restricted credits, and henceforth there should be some relaxation as to these restrictions, to the encouragement of commerce. The fears as to financial difficulties are now narrowed down to two, referring respectively to refunding operations of railroads and to the return of American securities held abroad. As to the railroads, their fate rests largely with the Interstate Commerce Commission, which at this time of all times should cut red tape and hasten to constructive effort. Apparently the commission needs to be reminded that it possesses the power it has exercised most freely in recent years, that of reducing rates. If it permits rate advances at this critical juncture, the power to restore old rates in the future is not going to be taken from it.

With respect to the return of American securities, there is some encouraging news. Strange to relate, as it now seems, there has never been a generally accepted statement of the volume of American securities held abroad, and an effort is only now being made to determine the volume. A partial return just made shows that in the case of 37 American corporations, 13 of them being railroads, the total par value of capital stock is \$2,849,801,879, and the amount held in Europe is \$196,969,967, or 6.9 per cent. From this partial showing it is already regarded as certain that the estimates made in some quarters, of five or six billions held abroad, are altogether out of line. The total may be less than half as much. To the layman the total figures, in millions or billions of dollars, mean little, but the proportion of securities held abroad and at home means much. The proportion in the total is not likely to differ greatly from the proportion shown in the partial return already made, and this proportion of less than 7 per cent. is encouraging. The remaining 93 per cent. is a suggestion of the wealth and absorbing power of American investors. If each American holder of sixteen shares should purchase one additional share the absorption would be

complete. Of course, there would remain the question of payment, but the trends of late have been toward clarifying that situation.

Thus there are some excellent reasons for concluding that predictions of further curtailment in industrial movements may be worth nothing at all, and there are possibilities of the pendulum beginning to swing in the other direction very soon.

Reciprocal Trade With South America

It has become a generally accepted fact in the past few weeks that in our new development of foreign trade following the outbreak of a great European war the case of South America presents unusual difficulties, for the reason that South America is financially prostrated. Prior to the war the ambitions of most of the South American countries had led them into too rapid expansion, resulting in a more or less mild prostration. The financial aid extended by the countries now at war had been reduced, while now it is practically altogether removed. The common statement is that South America must be financed before it can become a buyer. It has been pointed out, further, that hitherto South American exports have been very largely to Europe, and thus if we desire in future to export goods to South America we must import goods of practically the same value from that country.

Some light of practical value can be thrown upon the case of iron and steel by a scrutiny of the details of the export trade hitherto conducted. The latest government statistics giving country of destination is for the year ended June 30, 1913, and from these statistics we have compiled the following table:

Exports to South America of Products Reported by Weight,
Twelve Months Ended June 30, 1913

	Gross tons	Value
Pig iron	2,275	\$35,130
Wire rods	16	1,050
Rails	94,040	2,868,507
Structural material	20,943	994,090
Steel bars	9,344	364,078
Iron bars	3,042	112,708
Iron sheets and plates	8,919	488,197
Steel plates	357	142,375
Steel sheets	12,716	836,488
Galvanized sheets	22,586	1,483,242
Tin plate	5,692	703,975
Hoops, bands, etc.	1,036	42,697
Pipes and fittings	14,785	1,088,005
Plain wire	35,479	1,616,721
Barb wire	30,885	1,653,747
Railroad spikes	1,422	62,456
Cut nails and spikes	2,422	97,678
Wire nails and spikes	1,258	68,144
Tacks, etc.	870	90,903
Bolts, nuts, rivets, washers.	3,635	273,958
Horseshoes	18	1,478
Cast iron radiators, etc.	6	495
Total	274,754	\$13,026,072

The tonnage represented above comprised only 9 per cent. of our total iron and steel exports in the period, which was the best year, either fiscal or calendar, in the history of our foreign trade. The percentage was very small, considering the possibilities of South America, and there is less occasion than perhaps has been generally assumed to shed tears over the possibility of our losing our South American trade. As a matter of fact we had very little to lose.

The detailed statement of iron and steel exports to South America makes a very interesting study. The items show very clearly the character of the demand. There is practically none for unfinished goods. There is not as much pig iron as of bolts,

nuts, rivets and washers. Billets and sheet bars do not appear at all, and rods only to the extent of 16 tons. Steel plates, the conversion of which into a finished product for use involves manufacturing processes of consequence, amount to only 357 tons, less than half the tonnage of tacks and similar products smaller than nails.

Articles that are almost or entirely ready for ultimate consumption, on the other hand, stand out prominently. Iron and steel bars, which can be worked up by the blacksmith, are fairly large, over 12,000 tons. Black sheets show an equal tonnage, and galvanized sheets loom still larger. Even tin plate shows up fairly well. The commodities ready for final consumption are the largest of all: 20,000 tons of structural material, 35,000 tons of plain wire, 30,000 tons of barb wire, and no less than 94,000 tons of rails.

The character of South American operations is clearly and precisely defined by this study. Practically nothing is required for manufacturing purposes; the goods purchased are almost entirely for immediate and direct consumption. The details here given suggest that steel exports to South America do not depend as largely upon financing of new projects as has been urged. Certainly the 66,000 tons of plain and barb wire was not all employed in projects that had been the subject of public financing, and the same may be said of the 35,000 tons of black and galvanized sheets and the 15,000 tons of pipes and fittings. A large portion of these commodities must have been bought by ordinary agriculturalists.

The detailed statement contains valuable suggestions as to where our trade has been weak. It is perfectly apparent that no country under the sun will use only 6 per cent. as large a tonnage of nails and spikes as of plain and barb wire, yet that is the ratio that obtained in our exports to South America. A possible explanation of why our nail exports to South America have been woefully light is suggested by the fact that cut nail exports were double those of wire nail exports. Perhaps we have not been careful to offer the kind of nails desired. There is a suggestion of this idea in the railroad spike exports. According to practice in the United States, if the rails sent to South America averaged 75 pounds per yard, the spikes required would have been nearly double the quantity we furnished, and if the rails were lighter than this the quantity required would have been still larger. There is reason to believe that South America bought rails in the United States that were laid with spikes obtained elsewhere, and it can hardly have been a question of price, for railroad spikes are certainly made at a low cost in the United States. It is to be noted, too, that there were only 1036 tons of hoops and bands and only 18 tons of horseshoes. Evidently there is much steel required for ordinary everyday consumption in South America that could be purchased much more largely from the United States, irrespective of whether or not large projects can be financed at this time.

As to the difficulty in interchanging commodities, the steel trade has a partial solution here and there. In the fiscal year 1913 we imported from Brazil manganese ore valued at the port of shipment at \$443,523, and in future the movement will doubtless be much larger. The United States Steel

Corporation can do this much of direct trading at least, without any difficulty in the financial exchange. The Bethlehem Steel Company's imports of iron ore from Chile will probably soon be large, presenting likewise an opportunity for more or less direct trading.

The True Condition of Business

The White House and the commercial agencies do not agree on the condition of business. A Washington dispatch dated Tuesday, October 13, says that President Wilson told his callers that business conditions throughout the country, with the exception of the cotton industry and those affected by the interruption of foreign exchange, are generally normal, his information being based on personal letters and reports that have come to the White House through the various government departments. Bradstreet's report, dated October 10, says that trade is uneven and below normal, presenting an admixture of continued ill effects of the European war, warm weather, depression in the Southern cotton-crop situation, high rates of money, although there are some signs of easing, hand-to-mouth buying, very slow collections, restricted industrial outputs and close scanning of credits. Dun's Review of the same date says that conditions as a whole are those of somewhat reduced transactions, but in some lines evidence of improvement is increasing; certain trades as, for instance, the shoe industry and some lines of dry goods, show considerable activity, due largely to the increased foreign demand occasioned by the war, but the great basic industries of iron and steel, copper and coal, are operating at much below normal, and the building trades are depressed. The commercial agencies are apparently overlooking an important source of information in not interviewing the White House before summarizing the results of their inquiries into the business situation.

"Made in the United States"

Other nations of the western continents have never liked the use of "America" as applied to the United States alone. They believe they have very good grounds for their complaint. Of course, the designation American has been accepted abroad, as well as in this country, as applied to our citizens only. The resident of Canada is a Canadian; of Mexico, a Mexican; of Brazil, a Brazilian, and so on. But in the greatly stimulated effort to increase the export trade of the United States, care should be taken that our goods are not branded in a manner which would give the slightest offense. The slogan "Made in America" has been sounded a good many times in the last two months. The wiser wording is "Made in the United States."

The great shrinkage in the pig-iron trade of Great Britain is shown by the circular of William Jacks & Co., London, for September 30, giving a tabulation of shipments from Middlesbrough. This shows that the coastwise and foreign shipments for the nine months ended September were only 783,439 gross tons, against 1,246,884 tons in the corresponding period of 1913. September shipments, however, showed some improvement on those of August, having been 58,923 tons, against 31,870 tons.

CORRESPONDENCE

The Commerce Commission's Disastrous Delay

To the Editor: Do you suppose that that estimable body of gentlemen called the Interstate Commerce Commission has ever realized for a moment that it is directly responsible for the prolongation of the present condition of the steel business and its allied branches in this country? If not, it seems to me that the sooner this realizing sense can be brought to them the better for business.

It is well known that the railroads are the only industry in the country which has not been able to raise the prices of what it has to sell during the last few years. Their expenses have increased tremendously—labor, taxes, supplies of all kinds, everything they use or buy, all have gone up. But they have been forbidden by the Interstate Commerce Commission, and in some cases by State railroad commissions, also, to raise their rates, and in some instances have even had them lowered. It is a fact that the steel business cannot prosper to any great extent unless the railroads are buyers. It is not only the orders of the railroads to the steel mills direct that are affected but the orders to the allied trades also. I am an importer of tool steel. I have in ordinary times a large business with the manufacturers of track supplies, machine tools, etc. All these lines are dependent more or less on the railroad trade. When the railroads do not buy these other lines do not buy either, and I, as well as the other steel men, both American and foreign, have to suffer.

Now, is it not time the Interstate Commerce Commission took a common-sense, business-like view of the matter and gave the railroads the small increase they ask for and let us have some business? The commission knows that the railroads need it. It said so in its last decision, only instead of giving the advance it told the railroads to go home and be good, and economize. That was not very encouraging to the roads, which are already economizing to the last cent and still many of them are running behind and cannot make their fixed expenses. Cannot something be done to bring a realizing sense of the present condition to the Interstate Commerce Commission, and to show its members that the conditions are largely the fault of the commission itself? And they will never be righted until the railroads get a fair deal and are allowed to raise their rates enough to put them on a sound footing and to enable them to raise money to buy supplies, make the necessary repairs, look after their upkeep and do what new work is absolutely necessary. Until this is done I can see very little hope for the general steel business in this country.

STEEL.

Bethlehem Steel Company Low Bidder on Armor Plate

The bids on armor plate for the new dreadnoughts California, Mississippi and Idaho were opened at Washington October 7. Secretary of the Navy Daniels stated that the Government will save by these bids \$150,222, as compared with those on which armor for the Arizona was awarded. The three new battleships will require 22,122 tons of class A (side) armor, 1203 tons of class A-2 (turret) armor, 870 tons of class B (special treatment plates) and 189 tons of class C armor (bolts and nuts). The bids of the steel companies on the various classes of armor follow:

	A-1	A-2	B	C
Carnegie	\$440	\$504	\$471	\$548.00
Midvale	436	486	466	376.00
Bethlehem	435	490	466	395.00
Carbon .....	...	...	...	431.20

The class A armor on the basis of the Bethlehem Steel Company's bid will cost \$9,623,070. It is estimated that two years will be required for the turning out of this order at South Bethlehem.

AUGUST EXPORTS AND IMPORTS

Iron and Steel Tonnage Imports Increase in Spite of War Conditions

The average daily loss in the value of exports of iron and steel and manufactures thereof in the month of August was \$203,509 as compared with \$70,658 in July and \$26,903 in June. This increasing loss in value brought the total monthly values down from \$18,927,958 in June to \$16,737,552 in July and only \$10,428,773 in August, which is but 43.6 per cent. of \$23,947,440, the value for August last year. The daily average loss in the value of similar imports has also increased from \$2020 in July to \$26,050 in August. These imports amounted to \$1,965,116 in August as against \$2,772,662 in July, \$2,835,290 in June and \$2,415,212 in August, 1913.

The exports for which quantities are given total 86,598 gross tons in August, 114,790 tons in July, 143,953 tons in June and 209,856 tons in August, 1913, showing that these tonnages have decreased 24.6 per cent. from the previous month and are now barely 41.3 per cent. of those of a year ago. All items given show a heavy loss, except steel sheets, in which it is comparatively small, and tin and terne plates which alone show a gain. The total value of iron and steel exports for which tonnages are given was \$3,410,086 in August, 1914, as against \$8,502,741 in August a year ago. The average value per ton of these exports was \$39.27 in August, 1914, as compared with \$40.52 in August, 1913.

Details of the exports of these tonnage commodities in August and the eight months ended with August, compared with the same periods of the previous calendar year, are as follows:

	August		Eight months	
	1914	1913	1914	1913
	Gross tons	Gross tons	Gross tons	Gross tons
Pig iron	2,918	19,996	83,299	185,020
Scrap	1,460	5,351	28,953	64,425
Bar iron	593	1,647	3,357	11,576
Wire rods	854	1,280	39,236	48,479
Steel bars	5,271	14,925	73,016	150,316
Billets, ingots and blooms, n.e.s.	2,714	4,208	32,613	81,904
Bolts and nuts	693	1,808	10,710	15,296
Hoops and bands	413	1,231	6,188	12,274
Horseshoes	40	81	740	852
Cut nails	132	308	2,944	2,493
Railroad spikes	796	696	5,500	8,357
Wire nails	1,133	4,196	19,349	32,244
All other nails, including tacks	152	324	1,676	2,793
Pipes and fittings		20,071	*104,487	210,661
Cast pipes and fittings	6,130		*12,842	
Wrought pipes and fittings	7,111		*17,732	
Radiators and cast-iron house heating boilers	363	417	2,453	5,470
Steel rails	10,030	43,818	129,265	331,676
Galvanized-iron sheets and plates	2,179	9,565	26,949	62,321
All other iron sheets and plates	628	2,191	5,979	19,023
Steel plates	7,184	20,122	78,644	170,012
Steel sheets	6,892	7,246	89,216	84,482
Structural iron and steel	15,851	33,154	134,167	281,668
Tin and terne plates	5,296	3,864	40,058	44,383
Barbed wire	4,753	7,099	47,647	51,710
All other wire	3,012	6,258	49,327	76,905
Totals	86,598	209,856	1,046,347	1,954,340

*Figures are for six months, January to June, inclusive.

†Figures cover period since June 30.

The total values of exports of iron and steel and manufactures thereof in the eight months ended with August, 1914, was \$140,245,689, against \$203,650,994 in the corresponding period of 1913; while the figures for imports were respectively \$20,718,089 and \$23,287,536.

In August the imports for which commodities are given amounted to 28,572 gross tons, as against 24,958 tons in July, 23,075 tons in June and 18,740 tons in August, 1913. The gain in tonnage from July was in scrap, billets, rails and tin and terne plates. Wire rods alone show a loss, dropping from 1112 gross tons in July to 172 tons in August. Imports of iron and steel for which quantities are given amounted to \$869,523 in value in August, 1914, or \$30.43 per gross ton, as compared with \$871,079 or \$46.53 per ton, for August a year ago.

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Details of the imports of tonnage commodities in August and the eight months ended with August, compared with the corresponding periods of the previous calendar year, are as follows:

	August		Eight months	
	1914	1913	1914	1913
	Gross tons	Gross tons	Gross tons	Gross tons
Pig iron (including ferro-silicon)		11,069		109,193
Ferrosilicon	1,113		4,586	
All other pig iron	12,765		85,155	
Scrap	3,469	1,686	22,351	36,574
Bar iron	1,615	1,818	13,433	20,961
Structural iron and steel	1,909	1,104	8,104	9,016
Ingots, blooms and steel billets		1,561		15,491
Steel billets without alloys	187		1,694	
All other steel billets	3,459		27,939	
Steel rails	2,070	52	11,340	2,562
Sheets and plates	271	152	3,121	2,290
Tin and terne plates	1,542	186	14,612	15,422
Wire rods	172	1,112	5,491	11,706
Totals	28,572	18,740	195,826	224,215

Imports of iron ore in August were 135,693 gross tons, against 141,838 tons in July and 213,139 tons in August, 1913. For the eight months ended with August, 1914, imports of this commodity were 986,576 gross tons, compared with 1,621,309 tons for the same period last year.

In view of the attendance of a number of its members at the convention of the National Machine Tool Builders' Association, the Administrative Council of the National Metal Trades Association will hold a meeting at the Hotel Astor, New York, on October 22. It is understood that a number of important matters connected with the association will be discussed.

The Iron and Metal Markets

LOWER RATE OF PRODUCTION

Two Rail Orders Go to British Mills

Further Exports of Wire Products—Semi-Finished Steel Weaker

While the drift of the steel trade to a lower scale of operations is still unchecked, it is to be noted that the reduction of working forces is very slight from week to week. This gives ground for the opinion that even a small buying movement might bring a turn for the better.

As the belief grows that the war will last much longer than has been commonly reckoned, its disastrous effects on American trade are more thought of, with less disposition among steel manufacturers to count on large exports to help out a home situation that was bad before the war came.

The course of the British iron industry, for example, has been disappointing. There has been a curtailment of blast furnace, steel works and rolling mill operations there, in the face of the cutting off of imports from Germany, which means that little business can be done in England by American steel companies. That British steel exports have suffered more than was looked for has caused much uneasiness. Low prices have resulted. One British rail mill has taken 30,000 tons of Australian rails and another 20,000 tons for South Africa against keen competition from Canada and presumably from this country.

In spite of duplications in published reports of export business, the orders for wire products taken by Pennsylvania and Ohio mills have reached a good total. In the past two weeks 12,000 tons of barb wire have been sent abroad and more of this business is pending including 3000 tons for France. A Youngstown mill has sold 3000 tons of wire rods for prompt shipment to England.

With little new buying, the various lines of finished products are affected much alike. Prices for all are weak and any sales of bars, plates and shapes at 1.20c. would mean 1915 delivery. For this year 1.15c. is done, and on plates the equivalent of 1.10c., Pittsburgh, in the Chicago and Central Western districts.

Apart from a Nashville, Chattanooga & St. Louis inquiry for 1000 box cars and that of the Northern Pacific for 1000 steel underframes, car works see no promise of business.

The Bridge Builders' & Structural Society reports that contracts taken by the bridge and structural shops of the country in September amounted to 38.5 per cent. of a month's capacity, against 27.5 per cent. in August.

Scattering foreign inquiry for sheets continues. American mills are reported via London to have taken orders for 750,000 boxes of drawback tin plates. Larger canning operations, traceable to the war, have brought the mills some additional orders also.

Our London cable notes an unconfirmed report of American sheet bar sales in Great Britain. Prices of semi-finished steel in the Central West have

weakened to \$20 for billets and \$20.50 for sheet bars at Pittsburgh and \$19.50 and \$20 respectively at Youngstown.

In cast-iron pipe competition is sharper. A Cleveland water works contract for 3250 tons was taken at \$21.20 delivered. Southern pipe makers are encouraged at the prospect of getting Pacific coast business with an \$8 rate via Panama Canal, as against \$13 heretofore.

Foundry pig iron, added to the vicissitudes of many months, has now to contend with new low prices for cast scrap. The cheapness of the latter has led foundrymen to use increasing amounts in their mixtures, so that the consumption of foundry iron has fallen off considerably. Some inquiry has appeared in the Central West for foundry iron for first quarter delivery, but makers are unwilling to quote to-day's prices. Cincinnati reports two sales amounting to 5000 tons for this year and early 1915.

An inquiry for 1000 tons of Southern iron comes from Italy, which has just bought 500 tons. Japan is asking for 5000 tons.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.				
	Oct. 14, 1914.	Oct. 7, 1914.	Sept. 9, 1914.	Oct. 8, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia...	\$14.75	\$14.75	\$14.75	\$16.00
No. 2, Valley furnace...	13.00	13.00	13.00	13.85
No. 2 Southern, Cin'ti...	12.90	12.90	13.25	14.25
No. 2, Birmingham, Ala.	10.00	10.00	10.00	11.00
No. 2, furnace, Chicago*	13.00	13.00	13.50	15.00
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.50
Basic, Valley furnace...	13.00	13.00	13.00	14.00
Bessemer, Pittsburgh...	14.90	14.90	14.90	16.65
Malleable Bess., Ch'go*	13.00	13.00	13.25	15.00
Gray forge, Pittsburgh...	13.65	13.65	13.65	14.40
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh...	20.00	20.50	21.00	23.50
O.-h. billets, Pittsburgh...	20.00	20.50	21.00	23.50
O.-h. sheet bars, P'gh...	20.50	21.50	22.00	24.50
Forging billets, base, P'gh...	25.00	26.00	26.00	29.00
O.-h. billets, Phila...	22.90	23.40	23.40	25.00
Wire rods, Pittsburgh...	26.00	26.00	26.50	26.50
Old Material, Per Gross Ton:				
Iron rails, Chicago...	11.25	11.35	12.00	14.00
Iron rails, Philadelphia...	14.00	14.00	14.00	17.50
Carwheels, Chicago...	10.75	10.75	11.25	12.25
Carwheels, Philadelphia...	10.50	10.50	11.50	12.50
Heavy steel scrap, P'gh...	11.00	11.00	11.25	12.00
Heavy steel scrap, Phila...	10.00	10.25	11.00	11.00
Heavy steel scrap, Ch'go...	8.50	8.50	9.50	12.00
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia...	11.50	11.50	12.00	13.50
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.25	10.50
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.12	1.12	1.15	1.32½
Iron bars, Pittsburgh...	1.15	1.15	1.20	1.55
Iron bars, Chicago...	1.00	1.00	1.07½	1.30
Steel bars, Pittsburgh...	1.15	1.15	1.20	1.40
Steel bars, New York...	1.31	1.31	1.36	1.56
Tank plates, Pittsburgh...	1.15	1.15	1.20	1.40
Tank plates, New York...	1.31	1.31	1.36	1.51
Beams, etc., Pittsburgh...	1.15	1.15	1.20	1.40
Beams, etc., New York...	1.31	1.31	1.36	1.51
Skelp, grooved steel, P'gh	1.15	1.15	1.20	1.35
Skelp, sheared steel, P'gh	1.20	1.20	1.25	1.45
Steel hoops, Pittsburgh...	1.25	1.25	1.30	1.60
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.95	1.95	1.95	2.05
Galv. sheets, No. 28, P'gh.	2.95	2.95	2.95	3.10
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.65
Cut nails, Pittsburgh...	1.60	1.60	1.60	1.55
Fence wire, base, P'gh...	1.40	1.40	1.40	1.45
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.05

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	Oct. 14, 1914.	Oct. 7, 1914.	Sept. 9, 1914.	Oct. 3, 1913.
Per Net Ton at Oven:				
Furnace coke, prompt...	\$1.60	\$1.60	\$1.65	\$2.15
Furnace coke, future...	1.75	1.75	1.75	2.25
Foundry coke, prompt...	2.00	2.00	2.10	2.90
Foundry coke, future...	2.15	2.15	2.25	3.00

Metals,

Per lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	12.00	12.00	13.00	16.87½
Electrolytic copper, N. Y.	11.37½	11.62½	12.25	16.50
Spelter, St. Louis...	4.65	4.80	5.65	5.30
Spelter, New York...	4.80	4.95	5.80	5.45
Lead, St. Louis...	3.35	3.37½	3.72½	4.42½
Lead, New York...	3.50	3.50	3.87½	4.57½
Tin, New York...	29.75	30.87½	33.75	40.80
Antimony, Hallett's, N. Y.	12.00	12.00	12.50	7.25
Tin plate, 100-lb. box, F'gh.	\$3.25	\$3.30	\$3.40	\$3.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft. are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8.	.15
Gauges under No. 8 to and including No. 9.	.25
Gauges under No. 9 to and including No. 10.	.30
Gauges under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

	Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12	13	14	15	16		
Annealed	\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10		
Galvanized	2.00	2.00	2.05	2.10	2.20	2.30	2.70	2.80		

Wire Rods.—Bessemer, open-hearth and chain rods, \$26 to \$26.50.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Steel				Iron			
Inches	Black	Galv.		Inches	Black	Galv.	
1½, ¾ and ¾	73	52½		1½ and 1½	66	47	
1½	77	66½		¾	65	46	
¾ to 3	80	71½		¾	69	56	
				¾ to 2½	72	61	
Lap Weld							
2	77	68½		1½	56	45	
2½ to 6	79	70½		1½	67	56	
7 to 12	76	65½		2	68	58	
13 to 15	53			2½ to 4	70	61	
				4½ to 6	70	61	
				7 to 12	68	55	

Reamed and Drifted							
1 to 3, butt.	78	69½		1 to 1½, butt.	70	59	
2, lap	75	68½		2, butt	70	59	
2½ to 6, lap	77	68½		1½, lap	54	43	
				1½, lap	65	54	
				2, lap	66	56	
				2½ to 4, lap	68	59	

Butt Weld, extra strong, plain ends							
1½, ¾ and ¾	68	57½		¾	63	52	
1½	73	66½		1½	67	60	
¾ to 1½	77	70½		¾ to 1½	71	62	
2 to 3	78	71½		2 and 2½	72	63	

Lap Weld, extra strong, plain ends							
2	74	65½		1½	65	59	
2½ to 4	76	67½		2	66	58	
4½ to 6	75	66½		2½ to 4	70	61	
7 to 8	68	57½		4½ to 6	69	60	
9 to 12	63	52½		7 to 8	63	53	
				9 to 12	58	47	

Butt Weld, double extra strong, plain ends							
1½	63	56½		1½	57	49	
¾ to 1½	66	59½		¾ to 1½	60	52	
2 to 2½	68	61½		2 and 2½	62	54	

Lap Weld, double extra strong, plain ends							
2	64	57½		2	55	49	
2½ to 4	66	59½		2½ to 4	60	54	
4½ to 6	65	58½		4½ to 6	59	53	
7 to 8	58	47½		7 to 8	52	42	

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 3 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
1½ and 2 in.	62	1½ in.	45
2½ in.	59	1½ and 2 in.	49
2½ and 2½ in.	65	2½ in.	45
3 and 3½ in.	70	2½ to 2½ in.	54
3½ and 4½ in.	72	3 and 3½ in.	57
5 and 6 in.	65	3½ and 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets		Cents per lb.
Nos. 3 to 8		1.40 to 1.45
Nos. 9 to 10		1.45 to 1.50
Nos. 11 and 12		1.50 to 1.55
Nos. 13 and 14		1.60 to 1.65
Nos. 15 and 16		1.70 to 1.75

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11.....	1.60 to 1.65
No. 12.....	1.60 to 1.65
Nos. 13 and 14.....	1.65 to 1.70
Nos. 15 and 16.....	1.70 to 1.75
Nos. 17 to 21.....	1.75 to 1.80
Nos. 22 and 24.....	1.80 to 1.85
Nos. 25 and 26.....	1.85 to 1.90
No. 27.....	1.90 to 1.95
No. 28.....	1.95 to 2.00
No. 29.....	2.00 to 2.05
No. 30.....	2.10 to 2.15

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11.....	1.95 to 2.00
No. 12.....	2.05 to 2.10
Nos. 13 and 14.....	2.05 to 2.10
Nos. 15 and 16.....	2.20 to 2.25
Nos. 17 to 21.....	2.35 to 2.40
Nos. 22 and 24.....	2.50 to 2.55
Nos. 25 and 26.....	2.65 to 2.70
No. 27.....	2.80 to 2.85
No. 28.....	2.95 to 3.00
No. 29.....	3.10 to 3.15
No. 30.....	3.25 to 3.30

Pittsburgh

PITTSBURGH, PA., October 13, 1914.

While reports received here are that financial conditions are slightly better in some sections of the country, this is not the case in the Pittsburgh district. The banks are closely holding their money, and it is hard to obtain even for legitimate projects. Business men feel that the banks are over conservative. There is no improvement in the local steel trade, but prices are showing a weaker tendency. All indications point to material wage reductions in blast-furnace and steel-works labor to be effective from January 1. Manufacturers feel that the time has come when labor must bear its just share of the depression. The only encouraging feature is the heavy foreign demand, mostly for wire products. It is estimated that within the last two weeks 12,000 tons or more of barb wire have been sent abroad, with a good deal more business of this character pending. Not enough buying is being done to test prices. The depression is the worst known in the steel trade for some years, new business being lighter than in the fall of 1907, after the panic started in that year.

Pig Iron.—There is no new inquiry out for pig iron of any kind, and in some cases consumers are holding up shipments. Stocks in the furnace and steel-works yards are heavy and are rapidly increasing. Several small sales of No. 2 foundry have been made at about \$13 at furnace. Nominal prices are as follows: Bessemer, \$14; basic, \$13; malleable Bessemer, \$13; No. 2 foundry, \$13 to \$13.50; gray forge, \$12.75, all at Valley furnace, with a freight rate of 90c. a ton for Cleveland or Pittsburgh delivery.

Billets and Sheet Bars.—Prices are weak, largely due to the efforts of one or two mills to secure business for last quarter of the year delivery, and which are making low prices. However, little new business is coming out either in billets or sheet bars, consumers being covered by contract under which they are getting steel at slightly less than the quoted prices. We quote Bessemer and open-hearth billets at \$20 and Bessemer and open-hearth sheet bars \$20.50, f.o.b. Pittsburgh; Bessemer and open-hearth billets \$19.50 to \$20 and Bessemer and open-hearth sheets bars \$20 to \$20.50, f.o.b. Youngstown. If a large order came on the market these prices would be shaded. Forging billets are quoted at \$25 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take \$1 per ton extra. We quote axle billets at \$23 to \$24, f.o.b. Pittsburgh, depending on the order.

Ferroalloys.—The reduction of \$12 a ton recently made in the price of English ferromanganese has not stimulated new demand in the slightest. Consumers are covered by contracts at lower figures, and shipments are coming in from England quite freely. We quote 80 per cent. ferromanganese at \$68, seaboard, but have not heard of any sales at this price. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is \$19; 11 per cent., \$20; and 12

per cent., \$21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegel-eisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—There is no new business in the market on standard sections, and the new demand for light rails is also very dull. Some traction projects that were talked of some time ago, and that would have taken fairly large quantities of light rails and also standard sections, have been put off until next year on account of the tight money market. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth, 1.34c., at makers' mills. Prices on light rails are lower, and depend on the order and deliveries wanted.

Structural Material.—Local fabricators report conditions dull and little new work is coming out. The Canton Bridge Company, Canton, Ohio, has taken 900 tons for a new bridge at Ellwood City, Pa., and W. N. Kratzer & Co. have taken 100 tons for an addition to a building for the General Fireproofing Company, Youngstown, Ohio. Bids will go in shortly on the Schenley high school to be erected in this city, which will require about 1500 tons. Prices are barely steady. We quote beams and channels up to 15 in. at 1.15c. to 1.20c., Pittsburgh.

Plates.—The situation in plates seems to be getting worse. No new car orders are being placed, and no inquiries are out. The Pressed Steel Car Company will build about 30 cars a day for the next two months at its McKees Rocks plant, but its Woods Run works is closed down. None of the mills is operating to more than 50 per cent., and two or three are operating only intermittently as orders warrant. Prices are weak. While we quote ¼-in. and heavier plates at 1.15c., there is no doubt that 1.10c. could be done on a desirable order.

Skelp.—Foreign inquiries for grooved and sheared steel skelp are still coming to local mills, and some business is being placed. This nets the mills about the same prices as are quoted on domestic orders. The domestic demand for skelp is dull, as the pipe mills are not operating to more than 35 to 40 per cent. of capacity. We quote: Grooved steel skelp, 1.15c.; sheared steel skelp, 1.20c.; grooved iron skelp, 1.50c., and sheared iron skelp, 1.60c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—Foreign demand for wire rods has quieted down, but a Youngstown mill is stated to have taken an order for 3000 tons for prompt shipment to England, part of which has gone forward. The domestic demand for wire rods is quiet, but owing to the activity in barb wire the rod mills are operating to nearly full capacity. We quote Bessemer, open-hearth and chain rods at \$26, f.o.b. Pittsburgh, for either foreign or domestic business.

Iron and Steel Bars.—Conditions in the iron and steel bar trade are very unsatisfactory. New demand is dull and specifications against contracts are coming in at only a fair rate. Shipments by the mills are lighter than a month or two ago, and the outlook for the winter months is not good. We note a continued active demand for steel bars for reinforcing purposes. It is stated that fairly large contracts for steel bars for delivery in the first half of 1915 have been placed at 1.20c. to 1.25c., Pittsburgh, but some mills will not sell for delivery so far ahead at less than the higher price. We quote common iron bars at 1.15c. to 1.20c., Pittsburgh.

Sheets.—We note a continued active foreign inquiry for sheets, and considerable business has been closed, with more pending. The new domestic demand for sheets is quiet and mills report that specifications against contracts are only fair. Prices are not so firm as they were a month or two ago, galvanized sheets being weaker on account of the severe decline in spelter. In a general way, the market on No. 28 Bessemer black sheets is 1.95c. to 2c., and on No. 28 galvanized, 2.95c. to 3c., but in some cases galvanized sheets have sold at 2.90c. at mill. The sheet mills are operating from 60 to 75 per cent. of capacity, but some mills are

running only four days a week on account of lack of orders. Box annealed sheets are 1.40c. to 1.45c., some mills holding for the higher price. We quote No. 28 black plate, tin mill sizes, H. R. and A., at 1.95c. to 2c.; Nos. 29 and 30, 2c. to 2.05c. The above prices are for carload and larger lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—Reports that a large order for tin plate had been placed on the basis of \$3.10 at maker's mill are strongly denied, and it is not believed that any such low price has been made. The war has caused a heavier pack of canned meats, and this has developed quite an additional demand for bright plate for canning purposes. For this reason the season in tin plate this year will probably last about one month longer than usual. While there are signs of a letting down in operations, several of the larger tin-plate makers state they expect to be fairly busy up to about November 15. There is some small inquiry, but not much new business is being placed and prices range from \$3.25 to \$3.50 per box, the American Sheet & Tin Plate Company holding for \$3.50 per box for prompt shipment. We quote 100-lb. 14 x 20 coke plates at \$3.25 to \$3.50 per box and 100-lb. 14 x 20 terne plates at \$3.25 to \$3.40 per box, f.o.b. Pittsburgh.

Wire Products.—There has been a very heavy demand for barb wire from Russia, France and England, and it is stated that orders for 10,000 to 12,000 tons have been closed in the past month, with a great deal more business pending. Recently an inquiry came in the market for 3000 tons of barb wire, most of it for shipment to France, and several local mills and a Youngstown mill have participated in this business. A spool of barb wire weighs about 56 lb., and 40 spools are computed to the gross ton, and this recent order would therefore aggregate 120,000 spools. One local maker of barb wire states that its plant is filled up for the rest of this month and it is figuring on some heavy foreign inquiries. There is also some foreign inquiry for plain wire and wire nails, and a fair amount of business is being closed for shipment abroad. The domestic demand for wire and wire nails is quiet, but specifications are fair, and these, with the foreign business being placed, serve to keep the wire mills employed to upward of 75 per cent. of capacity. Most of the domestic shipments of wire nails now being made by the mills are on the basis of orders previously taken at \$1.55 to \$1.60, and on plain wire \$1.35 to \$1.40 per 100 lb. Mills state that on foreign business practically domestic prices are ruling. On new orders we quote wire nails at \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at \$1.60 to \$1.65, f.o.b. Pittsburgh, in carload lots. We quote woven wire fencing at 73 per cent. off in carload lots, 72 on 1000-rod lots, and 71 on smaller lots, all f.o.b. Pittsburgh.

Shafting.—The automobile makers are specifying quite freely against contracts, but other large consumers, such as the implement makers, are taking out only a moderate tonnage. The new demand continues quiet and only for small lots. We quote cold-rolled shafting at 66 per cent. off in carload lots, delivered in base territory, but on a desirable specification 67 off would probably be named.

Hoops and Bands.—Specifications against contracts are not heavy, but makers of hoops report fairly good specifications from the Pacific coast. The new demand for bands is light and for small lots. We quote steel bands at 1.15c. to 1.20c., with extras as per the steel bar card and steel hoops at 1.25c. to 1.30c., f.o.b. Pittsburgh.

Nuts, Bolts and Rivets.—Some foreign inquiry for nuts and bolts is being received, and makers report they are entering a fair run of orders. The domestic demand for nuts and bolts is quiet and only for small lots. Consumers are specifying at a moderate rate against contracts placed some time ago for shipment over the remainder of this year. Some low prices are still being named by several makers who have large stocks which they desire to move. Prices on rivets are weaker, and we now quote structural rivets at 1.45c. to 1.50c. and

boiler rivets at 1.55c. to 1.60c. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws.....	80 and 5% off
Small carriage bolts, cut threads.....	80% off
Small carriage bolts, rolled threads.....	80 and 5% off
Large carriage bolts.....	75 and 5% off
Small machine bolts, cut threads.....	80 and 5% off
Small machine bolts, rolled threads.....	80 and 10% off
Large machine bolts.....	75 and 10% off
Machine bolts, c.p.c. & t nuts, small.....	80% off
Machine bolts, c.p.c. & t nuts, large.....	75 and 5% off
Square h.p. nuts, blank and tapped.....	\$6.30 off list
Hexagon nuts.....	\$7.20 off list
C.P.C. and r sq. nuts, blank and tapped.....	\$6.00 off list
Hexagon nuts, 1/2 in. and larger.....	\$7.20 off list
Hexagon nuts, smaller than 1/2 in.....	\$7.80 off list
C.P. plain square nuts.....	\$5.50 off list
C.P. plain hexagon nuts.....	\$5.90 off list
Semi-fin. hex. nuts, 1/2 in. or under.....	85, 10 & 10% off
Semi-fin. hex. nuts, 3/4 in. and larger.....	85 & 5% off
Rivets, 7/16 x 6 1/2, smaller & shorter.....	80, 10 & 5% off
Rivets, tin plated, packages.....	80, 10 and 5% off
Rivets, metallic tinned, packages.....	80, 10 and 5% off
Standard cap screws.....	70, 10 and 10% off
Standard set-screws.....	75, 10 and 10% off

Railroad Spikes.—The new demand is dull and only for small lots. The railroads are not specifying against orders placed early in the year. None of the spike makers is running to more than 40 per cent. of capacity, and several plants are about idle. We quote standard sizes of railroad and boat spikes at \$1.40 and small railroad and boat spikes at \$1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Merchant Steel.—Consumers are not buying freely, and shipments from the mills are lighter than for some months. Prices are largely nominal, as there is so little business, but on small lots are about as follows: Iron finished tire, 1/2 x 1 1/2 in. and larger, 1.30c., base; under 1/2 x 1 1/2 in., 1.45c.; planished tire, 1.50c.; channel tire, 3/4 to 1 in. and 1 in., 1.80c. to 1.90c.; 1 1/2 in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Standard Pipe.—There is a fair demand for standard iron and steel pipe, but nothing is being done in casing and oil-well supplies. Makers state it is surprising how well prices are being maintained in view of the fact that so little new business is being placed and that all the mills are so badly in need of orders.

Old Material.—Practically no scrap is moving from dealers to consumers, and the market is lifeless. Consumption has fallen off very much in the past few months. Consumers seem to have enough scrap to meet their needs and are not interested in the market even at the low prices ruling. There is some inquiry for machine shop turnings, and a sale of 350 tons is reported at \$8.50 delivered. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights dealers quote about as follows:

Heavy steel melting scrap, Steuben-	
ville, Follansbee, Brackenridge,	
Sharon, Monessen, Midland and	
Pittsburgh delivery.....	\$11.00 to \$11.25
Compressed side and end sheet scrap.....	9.50 to 9.75
No. 1 foundry cast.....	11.50 to 11.75
No. 2 foundry cast.....	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers'	
mills, Pittsburgh district.....	8.25 to 8.50
Rerolling rails, Newark and Cam-	
bridge, Ohio, Cumberland, Md., and	
Franklin, Pa.....	12.00 to 12.25
No. 1 railroad malleable stock.....	10.25 to 10.50
Railroad grate bars.....	9.50 to 9.75
Low phosphorus melting stock.....	13.50 to 13.75
Iron car axles.....	19.00 to 19.50
Steel car axles.....	13.50 to 14.00
Locomotive axles, steel.....	20.00 to 20.50
No. 1 busheling scrap.....	9.50 to 9.75
No. 2 busheling scrap.....	6.50 to 6.75
Machine shop turnings.....	7.75 to 8.00
Old car wheels.....	11.25 to 11.50
Cast-iron borings.....	8.50
Sheet bar crop ends.....	11.00 to 11.25
Old iron rails.....	13.00 to 13.25
No. 1 railroad wrought scrap.....	11.00 to 11.25
Heavy steel axle turnings.....	8.25 to 8.50
Heavy breakable cast scrap.....	10.75 to 11.00

†Shipping point.

Boiler Tubes.—The new demand for merchant tubes is fair, but mostly in small lots, while for railroad tubes there is practically no new inquiry. Discounts continue to be materially shaded.

Coke.—There is no new inquiry for blast-furnace or foundry coke, and the market is about stagnant. The asking price on standard Connellsville furnace coke for prompt shipment is \$1.60 per ton, but high sulphur coke has sold as low as \$1.40 per ton. On contracts several makers are quoting \$1.75, and one leading producer names \$1.85 per net ton at oven. Prices on foundry coke are weaker, and we quote standard 72-hr. makes at \$2 to \$2.25 per net ton at oven. Some makes of foundry coke are offered for prompt shipment as low as \$1.85 at oven. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ended October 2 as 249,152 tons, an increase over the previous week of about 2000 tons.

Chicago

CHICAGO, ILL., October 13, 1914.

Encouragement, where it is taken at all, is based on specific circumstances rather than general conditions. Inquiry for about 5000 tons of rails appeared last week, and sales of about 1500 tons, for prompt shipment, were made. A scattering of structural orders materialized, and there is a promise of considerable building at Chicago when financial conditions adjust themselves more favorably. There is a likelihood of a round tonnage of Southern pig iron being placed for export through the Chicago market. Aside from individual experiences connected with such transactions as the above, the situation presents no signs of improvement. Prices for steel have fallen back practically to the basis prevailing at the end of the first half, and the tonnage available provides for little more than a 50 per cent. operation of the mills. A further reduction in active merchant pig-iron capacity in this district, now already reduced 75 per cent., seems likely. The situation of the producers could hardly be worse, and there is accordingly but little object in their making further price concessions to take inconsequential tonnage. Old material prices are still on the down grade, and a number of surprisingly low quotations have been made.

Pig Iron.—The only interesting transactions under way in this market involve the export of 500 tons by Southern interests for delivery in Italy, an inquiry for 1000 tons for similar shipment, and an inquiry for 5000 tons for shipment to Japan, at the rate of 1000 tons monthly. Shippers of Southern iron selling to destinations not on the roads included in the reduced-tariff decision are consigning cars to the nearest point where such reductions apply, and reshipping wherever a local pig-iron rate is in effect. Even this, however, does not relieve the handicap in many instances. About the only business reported in Southern iron is in carload lots. The best that the Northern furnaces still in blast can do is to limit as far as possible the increase in stocks on hand. The persistent buyer finds himself able eventually to secure the little iron he needs at very low prices, but the small proportion of total capacity in blast in this market, with a likelihood of a still further reduction, suggests that prices will suffer little, if any, additional decline. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.75 to \$16.75
Northern coke foundry, No. 1	13.50 to 14.00
Northern coke foundry, No. 2	13.00 to 13.50
Northern coke foundry, No. 3	12.75 to 13.25
Southern coke, No. 1 f'dry and 1 soft	14.50 to 14.75
Southern coke, No. 2 f'dry and 2 soft	14.00 to 14.25
Malleable Bessemer	13.00 to 13.50
Standard Bessemer	17.00
Basic	12.75 to 13.25
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—A substantial increase in inquiry and buying of track fastenings since the

first of the month as compared with the preceding fortnight is to be noted. This apparent provision for track work is accompanied by sales of 500 and 1000 tons of rails and inquiry for nearly 5000 tons from a Western road, all calling for shipment through the remainder of this year. Railroad activity is still limited, however, to isolated instances. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, \$25.50 to \$26, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The prospect of new business for the car shops is limited to an inquiry from the Nashville, Chattanooga & St. Louis Railroad for 1000 box cars and an inquiry for 1000 steel underframes from the Northern Pacific. There is, however, nothing definite about the prospect for closing these inquiries. In the city of Chicago plans have been worked out for a number of steel buildings that now wait only on the question of financing. One of these, the State Building, at Fifth avenue and Randolph street is to go ahead and the 1200 tons of steel required has been placed with the American Bridge Company. The Moravia Construction Company will furnish 228 tons for a Missouri Pacific viaduct at Atchison, Kan.; the contract for 473 tons for State Hospital buildings at Alton, Ill., has been placed, and 188 tons for a county bridge at Buckley, Wash., will be fabricated by the Belle Fontaine Bridge Company. Contracts have been placed for two new school buildings at Chicago, requiring a total of about 700 tons, the steel for one building to be furnished by the Gage Structural Steel Company, and for the other by the George Laubenheimer Company. The market shows no quotable change in prices, and we continue to quote for Chicago delivery of plain shapes from mill, 1.30c. to 1.38c.

We quote for Chicago delivery of structural shapes from jobbers' stocks, 1.75c.

Plates.—Quotations on the basis of 1.10c., Pittsburgh, have been made more freely the past week. Some of the delivered prices quoted, figured back to the f.o.b. mill basis, show an even lower net quotation for some of the Eastern plate makers. New business continues light, and the market dullness is unrelieved by encouraging features of any sort. We quote for Chicago delivery of plates from mill 1.28c. to 1.33c.

We quote for Chicago delivery of plates from store 1.75c.

Sheets.—Reports of the steady adherence of the sheet mills to the full scheduled prices reflects a lack of new business rather than any particular steadiness of the market. It seems certain, in view of the sharp decline in spelter prices, that attractive specifications for galvanized sheets would be eagerly sought even at a concession. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.58c.; No. 28 black, 2.08c. to 2.18c.; No. 28 galvanized, 3.08c. to 3.18c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—The period of fall specifying by the agricultural implement interests is well under way, but mill bookings show no material improvement in tonnages taken out. Steel bars are subject to the same decline in prices as has been suffered by plates and shapes. Bar-iron tonnage also continues light, and the general market is very close to the 1c. mill basis. We quote for mill shipments as follows: Bar iron, 1c. to 1.05c.; soft steel bars, 1.33c. to 1.38c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Conditions prevailing in the market with respect to rivets are not conducive to a uniform maintenance of extras, and a marked irregularity in prices is accordingly noted. This is especially true of

rivets one-half inch and smaller. Bolt and screw business is almost entirely limited to orders against old contracts. We continue to quote from mill as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 85; cut thread, 80-5; larger sizes, 80; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, \$6.60 off per cwt.; hexagon, \$7.60 off per cwt. Structural rivets, $\frac{3}{4}$ to $1\frac{1}{4}$ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to $\frac{3}{4}$ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to $\frac{3}{4}$ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, \$6, and hexagon, \$6.70 off per cwt.

Wire Products.—Activity in wire products, largely confined to the foreign demand for barb wire, has been felt less in this territory than in the East, but the influence of substantial tonnages on the books at the mills can be noted. Domestic business in the West is of moderate volume only. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.18, all Chicago.

Cast-Iron Pipe.—The leading cast-iron pipe interest is reported as the low bidder for 3250 tons at Cleveland. Orders have also been taken for 300 tons at Red Bud, Ill., 200 tons for Evanston, Ill., 150 tons for Rockwell City, Iowa, and 100 tons for the South Park Commission at Chicago. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—Scrap transactions suggest practically no comment other than that associated with the continued decline of prices. Buying by consumers is very scattering and largely in the form of direct purchase from the railroad. New railroad offerings include 700 tons by the Soo Line, 1200 tons by the Northern Pacific and about 1200 tons by the Chicago & Alton. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$11.25 to \$11.50
Old steel rails, rerolling	10.00 to 10.50
Old steel rails, less than 3 ft.	9.50 to 10.00
Old carwheels	10.75 to 11.25
Heavy melting steel scrap	8.50 to 8.75
Frogs, switches and guards, cut apart	8.75 to 9.00
Shoveling steel	8.00 to 8.50
Steel axle turnings	6.50 to 7.00

Per Net Ton	
Iron angles and splice bars	\$10.25 to \$10.75
Iron arch bars and transoms	10.50 to 10.75
Steel angle bars	8.00 to 8.50
Iron car axles	14.25 to 14.75
Steel car axles	11.00 to 11.50
No. 1 railroad wrought	7.75 to 8.00
No. 2 railroad wrought	7.00 to 7.50
Cut forge	7.00 to 7.50
Steel knuckles and couplers	8.50 to 9.00
Steel springs	9.25 to 9.50
Locomotive tires, smooth	8.75 to 9.25
Machine shop turnings	4.75 to 5.00
Cast borings	4.75 to 5.00
No. 1 busheling	6.50 to 6.75
No. 2 busheling	5.25 to 5.50
No. 1 boilers, cut to sheets and rings	5.50 to 5.75
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.00 to 9.25
Stove plate and light cast scrap	8.25 to 8.50
Grate bars	7.75 to 8.00
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.50 to 7.75
Pipes and flues	5.50 to 5.75

Philadelphia

PHILADELPHIA, PA., October 13, 1914.

The entire market is dull and sagging. Among steel men the impression is growing that the European war is to be a long one and that conditions here must be adjusted accordingly. In finished and semi-finished steel products there has not been enough business to test prices, and while there has been no authoritative announcement of a recession from 1.20c., Pittsburgh, for plates, shapes and bars, it is unquestioned that desirable orders could be placed on the basis of 1.15c. or 1.30c. here. Small orders for plain structural material have been a trifle more active in the week. Only a little pig iron has been taken. Scrap is stagnant, with many grades radically reduced. Billets are to be had subject to the decline of 50c. at Pittsburgh. The de-

mand for sheets has slowed up. Inquiries from abroad continue to be received for some products, but additional actual business for export develops slowly because of the difficulty in establishing credits. The overworked cables are causing delays, which in some cases do not permit the execution of orders in the time specified. Some good shipments of rivet bars and barbed wire have been made.

Iron Ore.—Imports at this port in the week ended October 10 were 6556 tons from Sweden and 4750 tons from Cuba.

Pig Iron.—The week has been one of continued dullness. Only a few small lots have been taken by the foundry trade. Pipe makers have taken one or two lots of about 1000 tons each, but on the whole there is not much to talk about. Pipe manufacturers say that business with them does not justify purchases of iron at this time. Virginia iron, while quiet also, seems to have been moving relatively better than other brands, especially in the case of the product of one maker. In steel-making iron there has been no activity beyond the customary movement of small tonnages of standard low phosphorus. Nothing is heard as to any general decline in quotations, and judging from the fact that some of the low-grade iron which was sold went at full prices, the range of standard brands is unchanged. Quotations are as follows for early delivery in buyers' yards in this district:

Eastern Penna. No. 2 X foundry	14.75 to 15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.30 to 15.50
Virginia No. 2 plain	15.05 to 15.25
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	21.00 to 21.50

Ferroalloys.—Interest continues lacking. The quotation named by representatives of English makers is unchanged at \$68, seaboard, for 80 per cent. Resale ferromanganese is still a factor. Importations continue liberal in quantity. Ferrosilicon is without change at \$71 to \$73, Pittsburgh, for 50 per cent. material.

Bars.—In steel bars there has not been enough inquiry or buying to establish the market, but it is conceded that 1.30c., Philadelphia, equal to 1.15c., Pittsburgh, would be named on a desirable inquiry. A fairly good tonnage of rivet bars has been exported. Iron bars are weak at 1.12c., Philadelphia.

Plates.—One eastern Pennsylvania plate mill is running only intermittently, and with others dependence is entirely upon small and miscellaneous orders for the reason that all kinds of construction demanding plates is light. Although 1.35c., Philadelphia, continues to be quoted on such business as is coming out, on a good proposition 1.30c. would be accepted.

Structural Material.—Miscellaneous demand for plain shapes has shown a slight betterment. On this class of business 1.35c. continues to be quoted, but it is safe to say that no desirable proposition would be allowed to escape from the mills if 1.30c. were demanded. The trade is anticipating inquiries from the Government for the plain shapes to be needed in the construction of the battleship which will be built at a Government yard. There have been no developments in this direction in the case of the two battleships on which bids were submitted last week by private yards. The Lehigh & New England Railroad Company is asking for revised bids on its shops at Pen Argyl, which will require about 750 tons.

Billets.—In a market that is extremely dull there is no question that \$22.90 would be accepted for open-hearth rolling billets, in view of the decline of 50c. per ton at Pittsburgh.

Sheets.—A lighter demand for sheets is reported, but makers have enough orders in hand to keep them occupied for a few weeks. This product has heretofore held up relatively better than any of the others. For No. 10 blue annealed, quotations are 1.55c. to 1.60c., Philadelphia.

Coke.—The general dullness is shared in full degree by coke. Quotations for prompt furnace are about \$1.70 to \$1.75 per net ton at oven, and for prompt foundry, \$2.25 to \$2.35. Freight rates to this city

from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85 and Mountain, \$1.65.

Old Material.—In view of the rate of operations at their mills, consumers of scrap are not inclined to tie themselves up for future deliveries and the market is therefore very dull. Quotations of several grades are lower. For delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to 1.35c. per gross ton, quotations are as follows:

No. 1 heavy melting steel.....	\$10.00 to \$10.25
Old steel rails, rerolling.....	11.50 to 12.00
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	13.50 to 14.00
Old iron axles (nominal).....	18.00 to 18.50
Old iron rails (nominal).....	14.00 to 14.50
Old carwheels	10.00 to 10.50
No. 1 railroad wrought	12.00 to 12.50
Wrought-iron pipe	10.00 to 10.50
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Machine shop turnings	8.00 to 8.25
Cast borings	8.00 to 8.50
No. 1 cast	11.50 to 12.00
Grate bars, railroad	8.00 to 8.50
Stove plate	8.00 to 8.50
Railroad malleable (nominal).....	9.00 to 9.50

On their own petition, George L. and Howard M. Plitt, trading as Plitt & Co., iron and steel merchants, in the Real Estate Trust Building, Philadelphia, were adjudged bankrupts in the United States District Court, October 13. Edward F. Hoffman was appointed referee. In the schedule attached to the petition the liabilities are set at \$214,548.64, while the assets are fixed at \$367,429.97. The unsecured claims amount to \$205,000.

Cleveland

CLEVELAND, OHIO, October 13, 1914.

Iron Ore.—The shipping season will close with large stock piles of ore at many of the underground mines. When the operation of many of the properties was suspended this summer, mine owners hoped to get stocks of ore well cleaned up before the end of the season. In this they have been disappointed, owing to the fact that the expected late buying failed to materialize, except for a very small volume. Present conditions indicate that very few of the underground mines will be operated the coming winter. Shipments are falling off rapidly and boats are being laid up for lack of cargoes. We quote prices as follows: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old range non-Bessemer, \$3.00; Mesaba non-Bessemer, \$2.85.

Pig Iron.—Some inquiry for foundry iron for delivery after January 1 has developed, but no contracts are reported placed and the inquiries are regarded more as market feelers than as made with any desire to buy immediately. In spite of the limited buying for delivery in the last half that has been the rule, it is evident that quite a number of consumers will carry some iron over into next year. Some of the sellers are asking \$13.50 for No. 2 foundry iron for delivery after January 1. Actual sales are limited to a few carload orders of Northern and Southern foundry iron for prompt shipment, orders for the latter being booked at \$10, Birmingham. Stocks in local furnace yards are large. We quote, delivered Cleveland, as follows:

Bessemer	\$14.90
Basic	\$13.75 to 13.90
Northern No. 2 foundry.....	13.75
Southern No. 2 foundry.....	14.00 to 14.25
Gray forge	13.25
Jackson Co. silvery, 8 per cent. silicon.....	17.55
Standard low phosphorus, Valley furnace....	20.50

Coke.—There is no demand for either furnace or foundry grades. Furnace coke for prompt shipment is weak. Standard furnace coke is offered for spot shipment at \$1.50 per net ton at oven. However, \$1.60 is the general minimum quotation for the best makes. We quote standard Connellsville foundry coke at \$2.25 to \$2.50 for delivery during the remainder of the year.

Finished Iron and Steel.—There is very little new demand and the market as a whole shows little change, although specifications are coming out in better volume from the automobile makers and from manufacturers of automobile parts, such as forgings and springs. New orders for steel bars and plates are particularly scarce. Most of the mills are adhering to the 1.20c. price for steel bars for small lots, but it is admitted that a desirable inquiry would bring out a 1.15c. quotation. Bar iron is lifeless and both Cleveland mills are still shut down. We quote iron bars at 1.15c. to 1.20c., Cleveland. The market is weak and local mills must meet Chicago prices of 1.05c. or under to take orders for shipment to competitive points. Plates are being freely offered at 1.15c. In structural lines the only new work that has developed is the erection of a dock building in Cleveland for the passenger boat lines, which will require 500 tons of steel and for which bids have been taken. The demand for sheets is very dull and orders are not coming out in large enough sizes to test the market. Small lot sales are being made at 2c. for No. 28 black and 3c. for No. 28 galvanized, but these prices can be shaded \$1 to \$2 a ton on a desirable inquiry. The U. S. Cast Iron Pipe & Foundry Company has taken 3245 tons of cast iron pipe for the Cleveland waterworks, this company's bid being approximately \$21.20 a ton, f.o.b. Cleveland. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Bolt and nut specifications are very light and there is very little new business. Prices are weak. Little new rivet business is reported, consumers being covered by contracts on which they are specifying fairly well. We quote structural rivets at 1.50c. and boiler rivets at 1.60c. We quote discounts as follows: Common carriage bolts, $\frac{3}{8}$ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, $\frac{3}{4}$ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, \$6.30 off; hexagon h. p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon, $\frac{1}{2}$ in. and larger, \$7.20 off; 9/16 in. and smaller, \$7.80 off; semi-finished hexagon nuts, $\frac{1}{2}$ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—The condition of the scrap market has become more unsatisfactory. Prices are weaker and about the only transactions are between dealers. Scrap offered by the railroads last week brought low prices. A local mill has taken on a small amount of heavy melting steel at \$9.50. Yard dealers stocks are very large and plenty of material can be bought at the present ruling low prices. Steel car axles are particularly weak, having declined about 75c. a ton. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling.....	\$11.50 to \$12.00
Old iron rails	12.50 to 13.00
Steel car axles	12.50 to 13.00
Heavy melting steel	9.25 to 9.75
Old carwheels	10.75 to 11.00
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.75 to 10.00
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton	
Iron car axles	\$16.75 to \$17.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new.....	8.25 to 8.50
No. 1 busheling, old	8.00 to 8.25
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.25 to 10.50
Stove plate	7.50 to 8.00

The Globe Iron Company, Jackson, Ohio, has appointed the Domhoff & Joyce Company exclusive sales agent for its Globe high silicon silvery irons in Cleveland and vicinity. The sales in the Cleveland territory will be looked after by A. H. Vollmer, resident manager of the Domhoff & Joyce Company, 1331 Schofield Building.

Cincinnati

CINCINNATI, OHIO, October 14, 1914.—(By Wire.)

Pig Iron.—Confirmation is made of two sales of Northern foundry iron to Central Western melters, the total amount being close to 5000 tons. The carload business is also improving, as several local foundries have received rush orders from machine-tool builders in this section. The stove foundries are operating at about the same rate, as the weather has been too warm to bring out any quick demand for stoves and ranges. There is a considerable number of inquiries out for first-quarter iron, but books have not been formally opened and prices quoted are understood to be out of reason. However, there is an undercurrent of feeling that buyers are preparing to take hold and cover for future requirements and the last two weeks of the current month are expected to make a better showing. The Southern freight rate change still causes trouble. Several foundrymen who make their contracts for castings on a sliding scale basis, using Cincinnati delivered quotations, find that they are now charged both trackage and switching costs when shipments are delivered from competing lines from the South. In some cases these charges practically equal the 35c. reduction in the freight rate. Basic iron consumers in this territory are apparently not taking any interest in the market, and if any inquiries have been made they were put out under cover. The extremely low prices of scrap have doubtless had considerable effect on pig-iron quotations, as many foundries are using a larger percentage of old material than heretofore. There is no demand for malleable in this vicinity. Based on freight rates of \$2.90 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$13.40 to \$13.90
Southern coke, No. 2 f'dry and 2 soft.	12.90 to 13.45
Southern coke, No. 3 foundry.	12.40 to 12.90
Southern No. 4 foundry	11.90 to 12.40
Southern gray forge	11.40 to 11.90
Ohio silvery, 8 per cent. silicon.	17.20 to 17.70
Southern Ohio coke, No. 1.	15.20 to 15.70
Southern Ohio coke, No. 2.	14.20 to 14.70
Southern Ohio coke, No. 3.	13.95 to 14.20
Southern Ohio malleable Bessemer.	14.20
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel.	26.90 to 27.40

(By Mail)

Coke.—Although several foundries in this vicinity are consuming more coke than they were 30 days ago, there is practically no new business. This is attributable to the comparatively large amount of coke that is still due on contracts. Many foundries will perhaps be able to run through the first quarter of next year on coke already ordered. There is no change in the furnace coke situation. The southern Ohio furnaces are consuming but little, as most of them are cold. The demand for 48-hr. coke for domestic use is light. We quote Connellsville furnace coke around \$1.70 to \$1.80 per net ton at oven, but Pocahontas operators are holding at about 25c. per ton more. Foundry coke is practically the same in all three producing districts reported from here, with \$2.25 at oven representing the average quotation.

Finished Material.—While business has not taken a backstep, there is little to report, with the exception of an increased number of inquiries for galvanized sheets. These inquiries cover small quantities and are for prompt shipment. There is little contracting beyond January 1. Some large consumers seem inclined to come in the market, but are holding back on account of general financial conditions. As far as is known, neither the mills nor the jobbers are experiencing any difficulty in collecting on bills for material already shipped, and the situation is a trifle more encouraging. A comparatively large order for reinforcing concrete bars will be let by a local company within the next two weeks, and there is also some business in sight from outside sources. No. 28 black sheets are unchanged at 2.15c., Cincinnati, or Newport, Ky., and No. 28 galvanized at 3.15c. Store prices on both steel bars and small structural shapes range from 1.80c. to 1.85c.

Old Material.—The slack demand from all sources has brought about a weakening in the market. All

prices are off, and it is difficult to establish quotations on what might be considered an average basis. While several local foundries will buy a quantity of scrap soon, the tonnage is not enough to be considered in a general report. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap.	\$6.00 to \$6.50
Old iron rails.	10.75 to 11.25
Relaying rails, 50 lbs. and up.	19.50 to 20.00
Rerolling steel rails.	9.75 to 10.25
Melting steel rails.	8.50 to 9.00
Old carwheels	9.50 to 10.00
Heavy melting steel.	8.25 to 8.75

Per Net Ton	
No. 1 railroad wrought.	\$7.75 to \$8.25
Cast borings	3.75 to 4.25
Steel turnings	3.75 to 4.25
Railroad cast scrap.	9.00 to 9.50
No. 1 machinery cast scrap.	9.75 to 10.25
Burnt scrap	5.75 to 6.25
Old iron axles.	14.25 to 14.75
Locomotive tires (smooth inside)	9.00 to 9.50
Pipes and flues.	5.75 to 6.25
Malleable and steel scrap.	6.75 to 7.25
Railroad tank and sheet scrap.	4.75 to 5.25

Buffalo

BUFFALO, N. Y., October 13, 1914.

Pig Iron.—The market is exceptionally dull, with small inquiry and small total of business placed from consumers in this district and very few orders of any consequence reported from outside points. It is understood, however, that some sales of small aggregate have been made in New England, taken at a lower level of prices than prevailed last week. Current prices, so far as can be determined from the insignificant amount of business being done, are from \$12.50 to \$13.50 at furnace for lowest to highest grades, a little high silicon iron being reported as sold at \$14. Quite a percentage of melters report that business received is of a desultory nature and not sufficient to keep plants to more than partial capacity; others report instances of such large volume as to give a distinct tinge of hopefulness for the immediate future. Lyman P. Hubbell, president of the Fillmore Avenue Foundry & Iron Works, this city, announces that his company has been awarded a large contract for high grade gray castings, amounting to \$100,000, with additional business in sight. A fair amount of shipment on contracts continues to go out from furnaces. On account of the slight volume of transactions, prices can be only approximated and therefore last week's quotations are continued as follows, f.o.b. furnace, for last-quarter delivery:

No. 1 foundry	\$13.00 to \$13.50
No. 2 X foundry	12.75 to 13.25
No. 2 plain	12.75 to 13.00
No. 3 foundry	12.75
Gray forge	12.50 to 12.75
Malleable	12.75 to 13.25
Basic	13.50 to 14.00
Charcoal, regular brands and analysis	16.25 to 17.25
Charcoal, special brands and analysis.	20.50

Finished Iron and Steel.—Specifications are coming in fairly well, but new inquiry is slow. Such demand as there is calls for small lots only. Many manufacturing plants in this district are working on short time and short help—on a 40 or 50 per cent. capacity basis—and policies of economy and retrenchment are apparently being instituted in many instances, slack work enabling users of material to "clean house" as regards some classes of stock and utilize material on hand. Busier times are believed to be not far ahead, but stock replenishment in anticipation is not yet being made. Structural business is quiet, with indications of light lettings for some time to come. Locally, structural work is retarded by a lock-out of structural workers by contractors associated with the Builders' Exchange, who have determined upon an open-shop policy because of the unreasonable demands of labor, and consider this an opportune time to bring the issue to a solution. The Syracuse Bridge Company has the contract for 300 tons of steel work for a building at Olean for which the George A. Fuller Company has

the general contract. The Progressive Steel Company, Buffalo, took the contract for steel for the Grand Trunk station at the International Bridge entrance, Buffalo, 150 tons.

Old Material.—Aside from some local demand for cast scrap and a little increase in activity in wrought, the market is lifeless. A considerable tonnage of wrought scrap has been moved to Erie, Pa., on account of a large order for horseshoes for shipment abroad placed with a concern in that city. This has tended to stiffen the price for this commodity and it has advanced, at least temporarily, to \$10.50 per ton. Carwheels are still scarce and the price remains firm. We quote dealers' selling prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	\$10.25 to \$10.50
Low phosphorus steel	14.00 to 14.50
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.00 to 10.50
Old steel axles	11.50 to 12.00
Old iron axles	17.00 to 17.50
Old carwheels	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	11.25 to 11.50
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	9.00 to 9.75
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Birmingham

BIRMINGHAM, ALA., October 12, 1914.

Pig Iron.—The hold-up orders are worrying the producers and there are no sales of pig iron. Stocks will accumulate more largely than ever unless conditions change. Prices cut no figure, because there is no inquiry. Foundries are taking less iron, the sanitary pipe shops leading in this respect. The steel situation at the beginning of the week was in brief as follows: The Gulf States Steel Company's wire and fencing mill is running three to four days per week, the bar mill is operating 25 per cent. and the nail mill 30 per cent. The Tennessee Coal, Iron & Railroad Company's Bessemer rolling mill is on full turn; the open-hearth department at Ensley 33 1/3 per cent.; the rail mill idle and one blast furnace out for repairs. Ensley, however, will be on full turn by October 20. The American Steel & Wire Company's mill at Fairfield operates four days per week. Pig-iron manufacturers have no comment to make, beyond stating that it is the dulllest period they have ever known. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	\$10.50 to \$11.00
No. 2 foundry and soft	10.00 to 10.50
No. 3 foundry	9.50 to 10.00
No. 4 foundry	9.25 to 9.75
Gray forge	9.00 to 9.50
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—The market is extremely dull. Three idle plants at Gadsden will remain so indefinitely, according to announcement. Alabama and Tennessee pipe makers feel much better over the prospect of regaining the Pacific coast trade of 60,000 tons per annum. In the first place, the manufacturing interests are having the assistance of at least one local railroad interest looking to the establishment of a \$2 rate from Birmingham to Mobile and New Orleans, as compared with the present rates of \$2.75 and \$3, respectively, and working out the readjustment problem. Second, transcontinental lines have petitioned the Interstate Commerce Commission for a reduction of the all-rail rate of \$13 per ton. Third, one Pacific coast steamship interest is about to inaugurate sailings to Gulf ports, with another arranging to do so. The rate from Gulf ports to the Pacific coast via the canal will be \$6 per ton, the same as from New York to San Francisco. This combination of arrangements points to an early readjustment of the coast trade, and it is reported that actual transactions in pipe are in process of consummation based on this situation. Such continued low bids in the Northeast as \$20.50 delivered at Salem, Mass.,

do not indicate price steadiness in the resultant effect on Southern plants. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4 in., \$20; 6 in. and upward, \$18, with \$1 added for gas pipe.

Coal and Coke.—From two to three days, with a maximum of four days, is the status in operations of Alabama coal mines. The larger concerns work different collieries alternately, so as to tide the miners over the dull period. All coal consumers are taking less fuel, and with continued decrease of the coke output the prospect is not at all good. The diminished coke output takes care of itself. Very little furnace coke is on the market. The Pratt Consolidated has shut down its Newcastle ovens. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.75 to \$2.90; foundry, \$3.25 to \$3.40.

Old Material.—The scrap market reports very little business and weak prices. Some stocks have been sold at a sacrifice. Lower quotations are now openly made. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	\$13.00 to \$13.50
Old steel axles	12.50 to 13.00
Old iron rails	9.00 to 9.00
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.00 to 7.50
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	8.50 to 9.00
Stove plate	8.00 to 8.50

San Francisco

SAN FRANCISCO, CAL., October 7, 1914.

Inquiries of importance are even less in evidence than before. Some merchants report the tonnage going into distribution as about even with last year at this season, or not far below normal; but the jobbers are again reducing their stocks, and the movement from mill to merchant is extremely slow, with little prospect of revival until after the inventory period. Corrugated sheets are, as before, the principal exception to the general dullness. Another, of minor importance, is hoop steel, consumers of which have had about six months' business crowded into one, and have been anxious for quick deliveries. There is a fair but not especially active movement in wire products. Jobbing prices in general are low and irregular. There has been no tangible weakening of mill prices here.

Bars.—Specifications are less liberal, as most buyers are provided for at least several weeks with material purchased below the present basis of prices, and are now disposed to let their stocks run as low as possible, relying on the Steel Products Company's warehouse to meet any emergency requirements. The small jobbing trade through the country holds up fairly well, but building requirements, either in soft steel or reinforcing bars, are very light.

Structural Material.—Fabricating business is about as dull as ever, practically no new fabricating contracts of consequence having been closed. It is rumored, but not definitely confirmed, that the Union Iron Works will soon proceed with its foundry building, for which a fabricating contract is to be let. Steel plans are about ready for the Potrero municipal car barns, which is expected to be an attractive job. Plans are also about complete for the new city library, but the work is subject to delay, pending the sale of bonds.

Rails.—Current business is confined almost entirely to single carloads, though orders of this nature are fairly numerous. Some larger inquiries have been received.

Plates.—Business is dull, with requirements for oil-tank construction diminishing, and no important demand in other quarters. Jobbing business with the small shops is also at a low ebb.

Sheets.—The demand for corrugated sheets and galvanized sheets of corrugating sizes is well maintained, being even more extensive than usual. Merchants are well cleaned up on several sizes, and specifications are still coming out well, though there is no disposition to buy beyond actual needs. This active

movement may be accounted for by the large amount of produce remaining in the country, which must be protected from the weather. Considerable business is said to have been placed before the end of September at 2.90 to 2.95c., Pittsburgh, for No. 28, but the present figure of 3c. appears to be pretty well maintained. There is no movement worth mentioning in blue annealed or black sheets.

Standard Pipe.—There is a little seasonable demand in some quarters, but in the aggregate the movement is light, with the oil trade practically out of the market and little demand for waterworks.

Cast-Iron Pipe.—The Los Angeles contract went to the Standard Cast Iron Pipe Company, and that of Pasadena to J. W. Blair, representing Virginia firms. Oakland has placed a small order, and Grass Valley, Cal., is taking figures on about 185 tons. Some corporation orders have been placed, but such business is small and scattering.

Pig Iron.—Business has been about at a standstill for the last fortnight. The larger consumers are well supplied, and the tendency is to reduce rather than increase the stock on hand. There is no particular weakness apparent on the part of importers, but values are irregular, and in fact little more than nominal in the absence of important business.

Coke.—Foreign coke continues in fair supply, but as no more is being shipped the market remains firm. Consumers not already covered by contracts, however, show no disposition to buy much beyond current needs. German Syndicate coke, for prompt delivery at the foundries, is held at \$15 per gross ton; cargoes to arrive being quoted at \$13 to \$13.50 at ship's side.

Old Material.—Business in cast-iron scrap continues on about the same moderate scale as for some time. Offerings are ample, and prices remain at about \$14.50 to \$15 per net ton. Steel melting scrap is quiet, with a limited tonnage being delivered on contracts. Prices are about \$8 on the average.

St. Louis

ST. LOUIS, MO., October 12, 1914.

The Central Freight Association lines have instructed their agents at Ohio River points to demand their share of the old through pig-iron freight rate before the reduction was ordered. In the Central territory the roads chiefly affected are the Norfolk & Western, the Illinois Central, the Chicago & Eastern Illinois, the Panhandle, the Baltimore & Ohio, the Monon and the Pennsylvania.

Pig Iron.—Current business has continued in small lots, and in consequence prices are not indicative of what they would be with real competition. The largest transaction reported is 200 tons of gray forge iron, sold somewhere around \$9 Birmingham, it is reported. Foundries continue to take machine cast scrap because of the saving as compared with No. 2 Southern foundry.

Coke.—Best selected 72-hr. Connellsville coke is selling at around \$2.50 per net ton at oven. By-product coke, delivered St. Louis, remains at the Connellsville figure plus the \$2.80 freight rate which prevails from that point to St. Louis.

Finished Iron and Steel.—The only orders of consequence were one of about 500 tons for a commercial building at Springfield, which went to the Christopher & Simpson Company for erection, and one of about 200 for a hospital in St. Louis, which went to the Spuck Company, St. Louis. From warehouse the movement has slackened still further, but the prices are maintained because of the small quantities taken. We quote for delivery from warehouse as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 box annealed, cold rolled, 2.55c.; No. 28, galvanized, black sheet gauge, 3.55c.

Old Material.—Railroads continue to offer scrap despite the fact that there is no buying and no apparent prospect of any save the small foundry demand for No. 1 machine cast scrap as a substitute for No. 2 Southern pig. Relaying rails are being bought to a

very slight extent and the scarcity of supply makes the price fairly steady. Lists out include 2000 tons from the Wabash, 2000 tons from the Missouri, Kansas & Texas, 700 tons from the Vandalia, 600 tons from the New Orleans & Northeastern, and 2000 tons from the Union Pacific. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails	\$10.50 to \$10.75
Old steel rails, rerolling	10.75 to 11.00
Old steel rails, less than 3 feet	10.00 to 10.25
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.50 to 10.75
No. 2 railroad heavy melting steel scrap	9.50 to 9.75
Shoveling steel	7.50 to 8.00
Frogs, switches and guards cut apart	9.50 to 9.75
Bundled sheet scrap	4.50 to 4.75

Per Net Ton	
Iron angle bars	\$3.50 to \$10.00
Steel angle bars	8.25 to 8.50
Iron car axles	16.25 to 16.75
Steel car axles	11.25 to 11.75
Wrought arch bars and transoms	10.50 to 11.00
No. 1 railroad wrought	7.50 to 7.75
No. 2 railroad wrought	7.50 to 7.75
Railroad springs	8.75 to 9.00
Steel couplers and knuckles	8.25 to 8.75
Locomotive tires, 42 in. and over, smooth	8.25 to 8.75
No. 1 dealers' forge	7.25 to 7.75
Mixed borings	3.50 to 3.75
No. 1 busheling	6.75 to 7.00
No. 1 boilers, cut to sheets and rings	5.25 to 5.75
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	7.75 to 8.25
Railroad malleable	7.50 to 7.75
Agricultural malleable	7.00 to 7.50
Pipes and flues	5.25 to 5.75
Railroad sheet and tank scrap	5.25 to 5.50
Railroad grate bars	6.75 to 7.00
Machine shop turnings	4.50 to 4.75

New York

NEW YORK, October 14, 1914.

Pig Iron.—The better demand for textiles in New England and the increased operation of the mills there have been felt in the foundry trade in Massachusetts, as noted last week, and some of the textile machinery manufacturers have bought pig iron. It scarcely need be said that the competition of Buffalo and Eastern Pennsylvania furnaces made low prices. In New Jersey one foundry has closed for 500 to 750 tons for this year's delivery, but a larger inquiry in that district involving November and December deliveries is not yet closed. Freight rates on Virginia pig iron to New England and other Eastern points are in the same position as Alabama pig iron rates. Railroads not parties to the original complaint have not made the reductions ordered. For example, over the New Haven road the rate from Virginia furnaces to Boston has been reduced from \$3.75 to \$3.25, but the Boston & Albany and Boston & Maine have not made any reduction. Rates to intermediate points which it was expected would be reduced in conformity with the reductions from Virginia furnaces to Baltimore, Philadelphia, New York and Boston are the same as heretofore in the tariffs of railroads not included in the original order. New cases will probably have to be brought to secure the reductions which shippers expected from the Virginia rate decision. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.75 to \$15; No. 2 X, \$14.25 to \$14.50; No. 2 plain, \$13.75 to \$14. Southern iron is quoted at \$14.75 to \$15 for No. 1 and \$14.25 to \$14.50 for No. 2.

Ferroalloys.—An unusual incident in this market is the report of inquiries for export of small amounts of 80 per cent. ferromanganese, presumably for Sweden. Otherwise the market is without interest, consumers evidently resting secure in the belief that the supply will be fully equal to the demand for an indefinite time. Quotations remain at \$68, seaboard. Deliveries on contract are said to be entirely satisfactory. Ferro-silicon, 50 per cent., is still quoted at \$71 to \$73, Pittsburgh.

Finished Iron and Steel.—Hardly enough business is being transacted to establish a market. Prices therefore continue weak and the orders that are coming in are mostly for small lots, especially in plates and shapes. For these 1.20c., Pittsburgh, is reported,

though larger tonnages would no doubt go for considerably less. Because of a reported increase in export business domestic inquiry is said to be a little better the past week in steel bars and shapes. In bar iron, while the market has been quiet, there has been an increase in inquiry for future contracts. Records of the Bridge Builders' Society show that business transacted in the first six months of 1914 was larger than either half year period of 1913 and also that for the nine months of this year to October 1 there was an increase over that for the corresponding period of 1913. It was stated that while inquiries for bridge material were few, those that do appear generally result in business. Structural contracts which have been placed are the following: 1500 tons to Milliken Brothers for the American Sugar Refining Company, Brooklyn; 300 tons for a Hoboken school, to the Dover Boiler Works; 900 tons for a bridge for the Southern Railway over the Tye River, to the Pennsylvania Steel Company; 200 tons for the Elks Club, Utica, N. Y., to the Utica Structural Engineering & Boiler Works; 150 tons for a store for Park & Tilford, Madison avenue and Forty-sixth street, to the George J. Schnatz Iron Works Company. The Lackawanna Bridge Company has secured contracts for a building for the New Process Gear Corporation, Syracuse, N. Y., 250 tons, and for a building at Olean, N. Y., 300 tons, while Lewis F. Shoemaker & Co. will fabricate 200 tons for a post office building for the Central Railroad of New Jersey at Jersey City. It is reported but not confirmed that the Belmont Iron Works will furnish some material for car shops for the Atlantic Coast Line. It is learned that the Slawson-Decker Company is inquiring for 200 tons of material for a creamery at Pawling, N. Y. We quote mill shipments of steel bars, shapes and plates at 1.15c., Pittsburgh, or 1.31c., New York, and iron bars at 1.25c. to 1.30c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plate and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—Lyons, N. Y., will open bids October 17 on 2123 tons of 4, 6, 10 and 12 in. This is the only municipal letting of importance in sight at present. Private buying continues in good volume for the season. Prices show no improvement, continuing as low and unsatisfactory as they have been in the past few weeks. Carload lots of 6-in. are available at \$20 to \$20.50 per net ton, tidewater.

Old Material.—The use of scrap, from the dealers' standpoint, would seem to have gone out of fashion. No inquiries are being received, and the only sales made are such as result from the most strenuous canvassing of the trade. Stocks continue to increase all along the line and prices are still crumbling. The outlook presents few encouraging features. Dealers' quotations are nominally as follows, per gross ton, New York:

Old girder and T rails for melting.....	\$7.75 to \$8.00
Heavy melting steel scrap.....	7.75 to 8.00
Relaying rails.....	20.00 to 20.50
Rerolling rails.....	9.50 to 9.75
Iron car axles.....	15.00 to 15.50
Steel car axles.....	11.50 to 11.75
No. 1 railroad wrought.....	9.50 to 9.75
Wrought-iron track scrap.....	9.00 to 9.25
No. 1 yard wrought, long.....	8.25 to 8.50
No. 1 yard wrought, short.....	7.75 to 8.00
Light iron.....	3.25 to 3.50
Cast borings.....	6.00 to 6.25
Wrought turnings.....	5.75 to 6.00
Wrought pipe.....	7.75 to 8.00
Carwheels.....	9.50 to 9.75
No. 1 heavy cast, broken up.....	10.25 to 10.50
Stove plate.....	7.75 to 8.00
Locomotive grate bars.....	6.50 to 6.75
Malleable cast.....	7.50 to 7.75

Boston

BOSTON, MASS., October 13, 1914.

Old Material.—Few transactions are reported and prices are largely nominal. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia

prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. per ton more than dealers' prices.

Heavy melting steel.....	\$8.50 to \$8.75
Low phosphorus steel.....	13.75 to 14.75
Old steel axles.....	13.25 to 13.75
Old iron axles.....	21.25 to 21.75
Mixed shafting.....	12.00 to 12.25
No. 1 wrought and soft steel.....	9.00 to 9.25
Skeleton (bundled).....	5.50 to 5.75
Wrought-iron pipe.....	8.00 to 8.25
Cotton ties (bundled).....	6.25 to 6.50
No. 2 light.....	3.75 to 4.25
Wrought turnings.....	5.00 to 5.50
Cast borings.....	5.25 to 5.75
Machinery cast.....	11.25 to 11.50
Malleable.....	8.00 to 8.25
Stove plate.....	7.75 to 8.00
Grate bars.....	5.25 to 5.50

British Makers Need Business

Pig Iron Weak—Sales of Large Lots of Steel Rails at Low Prices

(By Cable)

LONDON, ENGLAND, October 14, 1914.

Pig iron is weak and slow, both home and export, but slightly more has been done in hematite. The output is still ahead of needs. The number of furnaces in blast in the three districts is 158, against 190 a year ago. Ferromanganese is weak, makers competing sharply, with little demand. It is nominally quoted about £13 (\$63.26). Rumors are circulated of American sheet bars being offered, but it is impossible to trace any substantial business and our own steel works want orders pretty badly owing to the indifferent state of the galvanized sheet and tin-plate trades. American sheet bars may be had at about £5 (\$24.33), cost, freight and insurance. Last week's tin-plate shipments were the largest since the war started. About 30,000 tons of rails for Australia has been booked by Bolckow, Vaughan & Co. and 20,000 for South Africa by Guest, Keen & Nettlefolds at low prices, owing to the sharp competition of Canadian mills. American barbed wire has been sold at £14 (\$68.13) per ton, cost, freight and insurance. Stocks of pig iron in Connal's stores are 107,132 gross tons, against 104,110 tons a week ago. Such quotations as are available are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 7½d. (\$3.07), against 12s. 9d. (\$3.10) last week.

Cleveland pig-iron warrants (Tuesday), 48s. 3d. (\$11.74), against 50s. 6½d. (\$12.30) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 49s. 3d. (\$11.98), against 51s. (\$12.41) last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 2s. 6d. (\$44.40), against £9 5s. (\$45.01) last week.

Steel ship plates, Scotch, delivered local yards, £7 (\$34.06).

Steel rails, export, f.o.b. works port, £6 (\$29.19), against £6 5s. (\$30.41) last week.

Hematite pig iron, f.o.b. Tees, 64s. 6d. (\$15.69), against 66s. 6d. (\$16.18), last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £5 2s. 6d. (\$24.94).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £6 10s. (\$31.62), against £6 12s. 6d. (\$32.23) last week.

Steel bars, export, f.o.b. Clyde, £7 (\$34.06), against £7 2s. 6d. (\$34.67) last week.

Many Blast Furnaces and Mills Idle—American Sales of Drawback Tin Plates

(By Mail)

LONDON, October 1, 1914.

There is no doubt that the general state of trade is unsatisfactory. If any evidence were needed other than that of public knowledge it is to be found in the August report of the British Steel Smelters' Association. The account given by one correspondent stated that "the iron and steel trade in the Bilston and Wednesbury district has been very slack during the quarter and has been acutely so in the latter center." The position is

said to have been unprecedented in the west of Scotland, where labor has been particularly restive. "Hardly a steel works in this district but has been stopped through some dispute or other in some of the departments during the quarter, and the Newton steel works have been shut down for eight weeks and are still idle with no present prospect of a settlement. Prices are right down to the basis and most works are only employed part time, while there are no signs of any improvement in the near future. Everything points to a slump in trade having taken place." Another sectional report remarks that "trade has become very bad . . . mills have been running more or less intermittently and a good deal of time has been lost." As regards South Wales it is stated that "there are no signs of improvement. There are a large number of furnaces and mills closed down and there is no immediate prospect of them reopening. American makers have captured 750,000 boxes of the rebate tin plate trade for the current quarter, therefore the employers who are accustomed to work these orders are now competing for orders with other employers."

On the other hand the government official publication, the Labor Gazette, remarks that during last month "employment at iron and steel works was fair and showed little change from a month ago, but it was not so good as a year ago." It is possible that in some directions the last few weeks have seen some improvement because of the extraordinary demands of the government for war material. In the Walsall district, indeed, where the saddlery and harness trades are located, there is much more work than can be handled expeditiously, while all plants engaged upon the production of ammunition and projectiles are running full tilt from week end to week end. Elsewhere there is practical stagnation. The galvanized sheet trade is in a very poor way, for example, and the fact that the government proposes to buy 80,000 tons or so and has already booked 20,000 tons does not compensate for the virtual closing of the lead-in export markets.

EXPORT TRADE BADLY CRIPPLED

India is completely at a standstill and not likely to do anything at the earliest till the local seas are freed from German warships, which for weeks have been sinking British vessels with absolute impunity. It is known that many vessels, other than those officially reported so far, have been destroyed, and the entire trade route east of Aden is now stopped pending some action by the British navy. Altogether we are struggling against a good many adverse factors here. Certain obstacles put in the way of traders carrying on their business abroad are certainly helping our trade competitors. Some people are losing patience with the routine of getting permits to ship material, and are placing orders in countries where these restrictions are missing. Of course, we are in a state of war and inconveniences must be felt, but some of the regulations, it is felt, go too far, while among the omissions of which grave complaint is made, is the free hand for nearly two months which has been given to enemy warships to prey upon our commerce.

The general state of the pig-iron trade is poor; there is no other word suitable. Production is being cut down again in the Cleveland district and yet the stocks increase. The output, indeed, is far from being all absorbed even reduced as it is, and new buying is of a hand to mouth character. Not only is there hardly anything about in foundry iron, but the demand for hematite has also weakened perceptibly, and prices have come down a little accordingly.

Semi-finished steel, after keeping up well, has now begun to crumble and American sellers are now much more disposed to cultivate business at lower prices. Buyers are, however, very shy even with 100 shillings c.i.f. Newport, quoted on sheet bars. The cabled advices reaching here from your side make most pessimistic reading, and if they even approximately represent the position show that for the present the markets here have little to hope for in the way of support from the United States. A little time ago America sold some tube strip (skelp) here, but actually not much business has been done. Finished steel is flat and prices have already come down considerably from the top fig-

ures reached under semi-panic conditions after the war broke out. A moderate amount of work is on the books, but it is no easy matter to get specifications, and this difficulty gives signs of developing further.

Metal Market

NEW YORK, October 14, 1914.

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin, New York		Lead, New York		Spelter, New York	
Oct.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
7.....	12.00	11.50	30.62½	3.50	3.35	4.90	4.75
8.....	12.00	11.50	30.35	3.50	3.35	4.85	4.70
9.....	12.00	11.50	30.25	3.50	3.35	4.85	4.70
10.....	12.00	11.50	30.00	3.50	3.35	4.85	4.70
13.....	12.00	11.50	29.75	3.50	3.35	4.80	4.65

Copper continues dull and quotations are lower. The price of tin has continued to sag in the absence of demand. A little interest is being shown in the low price of lead. Spelter is lower, despite some interest on the part of galvanizers. Antimony is practically unchanged.

New York

Copper.—Buying transactions are few and far between. Electrolytic could be had easily at 11.50c., cash, New York. Yesterday and to-day the metal was offered at 11.50c., full terms, equal to 11.37½c., cash, New York. There are many rumors afloat as to low offers supposed to have been made by holders, but these are not confirmed. Lake is nominal at 12c., and it is probable that a bid would bring out a lower figure, but it is hardly likely that the price could be shaded more than ½c. There has been some buying for export but not enough to affect the market. Exports this month total 6225 tons.

Tin.—The good demand of a few weeks ago for futures has tapered off and a dull, in fact stagnant, market exists to-day. A few inquiries have come out but the trade regards them as feelers rather than as a disposition on the part of consumers to act. The quotation yesterday was 29.75c., the low figure being entirely ascribed to the lack of business and the anxiety of dealers to sell. Tin has not been so low since 1909. Some interesting news from London is that trading in prompt shipments or deliveries within 14 days is now allowed on the London Metal Exchange. This is understood to force settlements of commitments falling due and has caused early deliveries to decline. Arrivals this month total 426 tons and there is afloat 2905 tons. In Holland on September 30 there was 4437 tons of unsold Banca tin stored as compared with 173 tons the same date of 1913.

Lead.—The market has been quiet, but more interest has been shown by consumers who realize that the metal is extremely cheap. They are known to be watching the market very closely and it is considered likely that any slight favorable development would not only cause them to buy but possibly to take on more than they actually require. The New York quotation continues at 3.50c., but the St. Louis price is now 3.35c.

Spelter.—In the last few days sales to galvanizers have been reported, although the larger consumers have not come into the market and the general demand is slow. The New York price is 4.80c. and St. Louis, 4.65c.

Antimony.—The market is quiet and prices are nominal at 13c. for Cookson's, 12c. for Hallett's and 11c. for other grades. It is understood that there have been good inquiries from abroad, particularly Russia, but these have not developed into much business.

Old Metals.—Quotations are lower, with a quiet market. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible.....	11.50 to 11.75
Copper, heavy and wire.....	11.00 to 11.25
Copper, light and bottoms.....	10.00 to 10.25
Brass, heavy.....	8.25 to 8.50
Brass, light.....	6.25 to 6.50
Heavy machine composition.....	10.75 to 11.00
Clean brass turnings.....	7.75 to 8.00
Composition turnings.....	9.00 to 9.25
Lead, heavy.....	3.25
Lead, tea.....	3.00
Zinc scrap.....	3.75

Chicago

OCTOBER 12.—The decided slump in all of the non-ferrous metals last week carried lead to the lowest quotation in 17 years. Very little interest is being displayed and copper quotations cannot be given with any certainty. The embargo placed on shipments of antimony from England is responsible for an advance in that metal, but tin, like the other metals, shows a continued decline. Spelter prices are also lower. No new quotations on zinc have been issued, but it is the general opinion that prices approximating 7c. can be done. We quote as follows: Casting Copper, 12c.; Lake copper, 12.25c., for prompt shipment; small lots, $\frac{1}{2}$ c. to $\frac{1}{4}$ c. higher; pig tin, carloads, 31c.; small lots, 33c.; lead, desilverized, 3.47 $\frac{1}{2}$ c., and corroding, 3.75c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 4.75c.; Cookson's antimony, 16c. for cask lots; other grades, 12c. to 14c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 10c.; copper bottoms, 8.50c.; copper clips, 9.50c.; red brass, 9c.; yellow brass, 6.50c.; lead pipe, 3.10c.; zinc, 3.50c.; pewter, No. 1, 22c.; tin foil, 25c.; block tin pipe, 27c.

St. Louis

OCTOBER 12.—The tendency in the non-ferrous metals has been downward with the result that lead is now quoted at 3.35c. bid to 3.40c. asked for carload lots; spelter, 4.60c. to 4.65c. for 100-ton lots; tin, 33c.; Lake copper, 12.75c.; electrolytic copper, 12.65c.; Cookson's antimony, 11c. In the Joplin ore district zinc blende was quoted lower, at \$35 to \$40 per ton, with the best figure for the choicest ores at \$43. Some ores went as low, under penalty, as \$30. Calamine continued weak and lower, at \$17 to \$20, for 40 per cent., with the top settlement at \$24. Lead ore was sharply off and at \$40, or \$6 below where it has been for many weeks. Miscellaneous scrap metals are quoted as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass, 8.50c.; heavy copper and copper wire, 10c.; lead, 3c.; zinc, 3c.; tea lead, 3c.; pewter, 20c.; tin foil, 29c.

Iron and Industrial Stocks

NEW YORK, October 14, 1914.

Prospects for the opening of the New York Stock Exchange are the subject of much discussion, but apparently no progress is being made. The decrease of \$26,000,000 in loans, shown in the New York bank statement for the past week, is believed to be the result of a readjustment of Stock Exchange accounts and, therefore, should have an important bearing on the question of resumption of trading. Meanwhile no authoritative quotations are available on iron and industrial stocks.

Dividends

The Dominion Steel Corporation, regular quarterly, 1 $\frac{1}{4}$ per cent. on the preferred stock, payable November 1.

The American Rolling Mill Company, quarterly, 2 per cent. on the common stock. This is a reduction of 1 per cent. from the customary quarterly disbursement and places the stock of the company on an 8 per cent. basis per annum as compared with 12 per cent. formerly. President George M. Verity says: "Earnings for the current quarter and prospects for the future might justify payment of full dividends, but in response to the spirit of economy and conservatism now in evidence, due to the unprecedented world-wide financial conditions existing, we deemed it wise and conservative to take this action. A further distribution will be considered when conditions become more normal."

The Emerson-Brantingham Company has passed the declaration of a dividend on its preferred stock which would have been due November 1, and has also passed the appropriation for the annual preferred stock sinking fund. The directors, in announcing this action, state that they deem it advisable and for the best ultimate good of the stockholders to conserve the com-

pany's cash resources in every way and to maintain it in a strong financial condition.

The Steel Company of Canada has decided to defer the payment of the dividend on the preferred stock which would have been due November 1. The dividend is cumulative.

The Union Steel Casting Company, regular quarterly, 2 per cent., payable October 15.

The Wheeling Steel & Iron Company has deferred action on its regular quarterly dividend of 2 per cent. until a later date.

Merchant Marine Developments

WASHINGTON, D. C., October 14, 1914.—The first results of the passage of the act of August 18, 1914, permitting vessels owned by Americans but flying foreign flags and engaged in the foreign service to be admitted to American registry, are shown in a statement compiled by the Commission of Navigation of the Department of Commerce. This statement, compiled to October 1, shows a transfer of 54 vessels, aggregating 217,201 tons, or an average of about 4000 tons each. Of the total number of vessels transferred to the American flag, 48 were of British registry, 5 of German and 1 of Belgian. Twelve are in the passenger service while 42 are running as freighters exclusively. All but three of the vessels are built of steel. Eleven of the largest, namely, the Santa Rosalia, Kentra, Bantu, Crofton Hall, San Francisco, Buena Ventura, Charlton Hall, Craster Hall, Howich Hall, Panuco and Pinar del Rio, have been registered by the United States Steel Corporation chiefly for the South American trade, the home port of the entire fleet being New York. New registrations are being made at the rate of about 50 per month, and it is estimated that for some time the foreign merchant service under the American flag will be increased by about 100,000 tons per month. While there are no official records showing accurately the American-owned tonnage heretofore registered under foreign flags, much semi-official information on the subject has been gathered by the Bureau of Navigation, and the commissioner estimates that prior to the passage of the new law the total of this tonnage was approximately 850,000 tons. It is expected that the great majority of this tonnage will be brought under the American flag in the course of a few months.

Unfavorable conditions in the shipbuilding industry, due in part to the general depression of the past year but emphasized to a considerable extent by the European war are reflected in a statement prepared by the Bureau of Navigation embracing the statistics of the industry for July, August and September, 1914, constituting the first quarter of the new fiscal year. In this period 383 vessels of 56,510 gross tons, about half being of steel, were built in the United States and officially numbered, as compared with 376 vessels of 90,222 gross tons for the corresponding period of 1913. The steel construction was limited to the Atlantic and Gulf coasts, upon which 8 vessels of 25,507 tons were built, and the Great Lakes, upon which 11 vessels of 2470 tons were constructed.

President Wilson has finally yielded to the pressure brought to bear upon him by Representatives and Senators, and has consented to permit the Alexander bill, creating a government-controlled corporation to purchase and operate steamships in the foreign trade, to go over without action until next winter. But notwithstanding the fact that the opposition among his party leaders is directed against the basic principle underlying the bill rather than to the matter of the timeliness of its present consideration, the President has stated very positively that he will insist upon the enactment of this measure as soon as Congress convenes in December for the short session, and he has even gone so far as to intimate that, if the bill is blocked at the short session, he will reconvene Congress next March for the special purpose of passing it. W. L. C.

The output of iron ore in Alsace-Lorraine in 1913 was 21,135,554 metric tons, as compared with 20,083,238 tons in 1912, an increase of 1,052,316 tons.

ARGUMENTS IN THE STEEL SUIT

Government Asks for "Independent Ownerships, With No Stockholders in Common"

Oral argument in the dissolution suit of the Government against the United States Steel Corporation will begin October 20 in the United States District Court at Philadelphia. The briefs on both sides, which are large printed volumes, have been filed. That of the Government's attorneys, Judge J. M. Dickinson and Henry E. Colton, consists of two octavo volumes, known as Part 1 and Part 2, the former containing 445 pages and the latter 406 pages. Part 1 covers ground described thus: "Formation of United States Steel Corporation and Subsidiaries—Restraint of Trade Thereby and Power Achieved." Part 2 carries forward the argument under the head, "Unlawful Combinations and Devices of United States Steel Corporation Subsequent to Its Formation, Restraining Trade and Maintaining Monopolistic Power." It is of interest to note what the Government's attorneys ask the court to decree—even to the separation of the Steel Corporation subsidiaries into companies "under wholly independent ownerships, with no stockholders in common." The italicized requirement in particular is interesting to a degree. Under the caption "Conclusion," the decree asked for is thus summed up:

"In view of the proof as to the unlawful character of the formation of the several subsidiaries of the Corporation, and of the Corporation itself, and the destruction of competition through each of said combinations, by bringing competitors under one control, and as to the unlawful acquisitions of the Corporation subsequent to its formation, and as to the power acquired and use of same to unlawfully restrain trade and commerce between the States and between the States and foreign countries, and as to the combinations made subsequent to the formation of the Corporation through the amalgamation of certain of its subsidiaries, and the use of its ore, coke, coal, railroads and other properties as a unit for carrying out the unlawful combination, it is asked in behalf of the Government that it be decreed:

"That the ownership and control by the Corporation of the Carnegie Steel Company of New Jersey, the Federal Steel Company, the American Steel & Wire Company of New Jersey, the National Tube Company, the American Sheet & Tin Plate Company, the American Bridge Company, the Shelby Steel Tube Company, the Lake Superior Consolidated Iron Mines, the Pittsburgh Steamship Company, the Union Steel Company, the Clairton Steel Company, and the Tennessee Coal, Iron & Railroad Company, are as to each of said companies an unlawful combination in restraint of trade;

"That the Carnegie Steel Company of New Jersey, the Federal Steel Company, the American Steel & Wire Company of New Jersey, the National Tube Company, the American Sheet & Tin Plate Company, the American Bridge Company, and the Shelby Steel Tube Company are each an unlawful combination in restraint of trade;

"That the Carnegie Steel Company of New Jersey, which combined under one control the Carnegie Company of New Jersey, the National Steel and the American Steel Hoop, the American Sheet & Tin Plate Company, which combined in one corporation the American Tin Plate Company and the American Sheet Steel Company, the Federal Steel Company, the American Steel & Wire, the National Tube, the Shelby Steel Tube and the American Bridge be divided, under wholly independent ownerships, with no stockholders in common, so that no person or company shall own or control works, whose production, as shown by recent previous years (1912 or 1913 being suggested), in any of the principal iron or steel products, exceeded a percentage to be fixed by the court (10 per cent. being suggested as a maximum), of the entire production of same for the United States for said year;

"That the Duluth & Iron Range Railroad Company and the Duluth, Missabe & Northern Railroad Com-

pany be made independent, not only of each other, but of any concern or corporation taking over any of the properties of the Corporation;

"That those concerns that shall come severally into control of the properties of the Corporation be enjoined from in any way combining or selling their products through the United States Steel Products Company or any common agency, and from having directors in common;

"That the Tennessee Coal, Iron & Railroad Company, the Union, and the Clairton, each be made entirely independent of the control of any persons or company which shall come into control of any of said subdivisions, and without any stockholders in common;

"That the ore and coal properties of the Corporation other than those of the Tennessee, be divided among the Clairton, the Union and the new concerns created, in proportion to their capacity for the production of steel;

"That the Great Northern lease is unlawful and that it be cancelled;

"That Andrew Carnegie was a party to the unlawful combination of properties through the Corporation, and took the bonds of the Corporation with all the infirmities attaching to such participation;

"That the said several defendant corporations shown to be subsidiaries of the Corporation be enjoined from declaring or paying any dividends to said Corporation or to any person or corporation for its use;

"That the defendants and each and every one of them, and the officers, directors, stockholders and agents of the defendant corporations and of each and every one of them, be perpetually enjoined from doing any act in pursuance of or for the purpose of carrying out any of said unlawful combinations;

"That a receiver be appointed to take over all of the properties owned or controlled by the Corporation and its said subsidiaries for the purpose of making effective the decree and orders of the court, and that such receiver be authorized and directed to take steps to recover for the use of the Corporation from the syndicate subscribers and promoters, and others who were parties to said unlawful combinations, the difference between the par value of the stock received by them severally and the cash value of the properties, or the services, given therefor, and this in order that restitution, so far as possible, may be made to the other stockholders;

"That costs be awarded against each of the defendants other than J. H. Gruber; and

"That jurisdiction be retained of the cause for fully effectuating the decree of the court."

Large Decrease in Steel Corporation Orders

The United States Steel Corporation's statement of unfilled orders on its books September 30 shows a total of 3,787,667 tons, as compared with 4,213,331 tons on August 31—a decrease of 425,664 tons for the month. On September 30, 1913, the unfilled orders totaled 5,003,785 tons. The following is a statement of unfilled tonnage for each month beginning with the high point of December 31, 1912:

September 30, 1914..3,787,667	October 31, 1913...4,513,767
August 31, 1914....4,213,331	September 30, 1913...5,003,785
July 31, 1914.....4,158,589	August 31, 1913....5,223,468
June 30, 1914.....4,032,857	July 31, 1913.....5,399,356
May 31, 1914.....3,998,160	June 30, 1913.....5,807,317
April 30, 1914.....4,277,068	May 31, 1913.....6,324,322
March 31, 1914....4,653,825	April 30, 1913....6,978,762
February 28, 1914...5,026,440	March 31, 1913....7,468,956
January 31, 1914...4,613,680	February 28, 1913...7,656,714
December 31, 1913...4,282,108	January 31, 1913...7,827,368
November 30, 1913...4,396,347	December 31, 1912...7,932,164

The Republic Iron & Steel Company has just completed improvements at its Sylvan mill at Moline, Ill., at a cost of about \$30,000. The improvements include a monorail system, two new heating furnaces, an additional unit in the power plant, and other general facilities.

The Packard Motor Car Company, Detroit, Mich., has received an order from the Russian government for 180 motor trucks for army service, the contract aggregating \$750,000.

PERSONAL

Paul Bigelow, Eastern manager of the Buckeye Engine Company, is to address the Brooklyn Engineers' Club, 117 Remsen street, Brooklyn, N. Y., on the evening of October 29 on the Buckeye-mobile.

Alfred P. Stewart has purchased the holdings of L. A. Green in the L. A. Green Equipment Company, Pittsburgh, and will assume the duties of president and treasurer of the company. Mr. Stewart has been connected with the United States engineers of the Pittsburgh district for the past 12 years and is thoroughly familiar with the machinery and equipment business in its many details.

F. N. Speller, metallurgical engineer of the National Tube Company, Pittsburgh, Pa., delivered a lecture October 9 on "The Modern Boiler Tube for Locomotive Service" before the St. Louis Railway Club, St. Louis, Mo.

T. L. Williams, California representative of the Lidgerwood Mfg. Company, who has been located in the Monadnock Building, San Francisco, has changed his headquarters to the Seattle office. The California stock of this company's hoisting equipment will hereafter be handled by N. B. Livermore & Co., San Francisco.

John C. Whiteside is now associated with the Superior Belting Mfg. Company, Rochester, N. Y., as vice-president and sales manager. He was formerly with the New York Leather Belting Company and the Victor-Balata & Textile Belting Company.

A. B. Ambler, 461 Market street, San Francisco, Cal., has been appointed Pacific coast representative of the Alan Wood Iron & Steel Company, Philadelphia, Pa.

Harry N. Taylor, Chicago, has associated himself with the Central Coal & Coke Company, Kansas City, Mo., as vice-president.

Charles M. Schwab has resigned as a director of the American Locomotive Company. The reason was stated to be that he desires to devote all his time to the Bethlehem Steel Corporation and other interests. Andrew Fletcher was elected to succeed him.

Andrew Carnegie will take part in the unveiling of the Robert Burns statue in Schenley Park, Pittsburgh, October 27. He will formally present the statue to the city.

Kenneth J. Grant, general Southwestern representative of the L. S. Starrett Company, Athol, Mass., mechanical tools, who has just concluded a 45-day trip through Illinois, Missouri, Oklahoma, Alabama, Texas, Louisiana and other States, reports a slight improvement in business throughout the territory after a bad slump three to four months ago. Machine shops and foundries which were then laying off men by the score are adding men or at least maintaining their pay-rolls. In the hacksaw blade department he reports some increased buying by railroad shops.

George M. Brill has been appointed director of the general reception committee for the International Engineering Congress to be held in connection with the Panama-Pacific Exposition in San Francisco next year. With headquarters in the Engineering Societies Building in New York City he is to organize reception committees in the large cities of the country. Among the members of the general reception committee are Walter M. McFarland, Babcock & Wilcox Company; William L. Saunders, Ingersoll-Rand Company, New York; E. D. Meier, Heine Steam Boiler Company; Ambrose Swasey, Warner & Swasey Company, Cleveland; Howel H. Barnes, Jr., General Electric Company; Stevenson Taylor, Quintard Iron Works Company, and Dr. A. C. Humphreys, Stevens Institute of Technology.

George P. Blackiston, advertising manager of the Berger Mfg. Company, Canton, Ohio, and of other

companies in that city, has been appointed publicity manager of the Canton Chamber of Commerce and in addition with his present duties will assist in promoting various campaigns of the chamber, including one to secure the location of more industries in Canton.

H. H. Hodell was elected president of the Van Dorn & Dutton Company, Cleveland, Ohio, at a special meeting of the board of directors, held October 12, to fill the vacancy caused by the death of James H. Van Dorn. Mr. Hodell was one of the founders of the company and for many years its vice-president. He is president of the Cleveland Galvanizing Works Company and is also interested in several other companies. T. B. Van Dorn, president of the Van Dorn Iron Works Company, was elected to succeed Mr. Hodell as vice-president. The active conduct of the company's affairs continues as heretofore under the direction of F. W. Sitram, secretary and treasurer, and Franklin Schneider, manager and chief engineer.

Dr. John A. Brashear, Pittsburgh, has been nominated for the presidency of the American Society of Mechanical Engineers. Other nominations are as follows: For vice-presidents: Henry Hess, Hess Steel Castings Company, Bridgeton, N. J.; G. W. Dickie, San Francisco, and James E. Sague, Public Service Commission of the Second District, New York. For managers: Charles T. Main, Dean & Main, Boston; Spencer Miller, Lidgerwood Mfg. Company, New York; Max Toltz, St. Paul, and Morris L. Cooke, director of public works, Philadelphia. William H. Wiley, John Wiley & Sons, New York, has been renominated as treasurer.

Pittsburgh Steel Company's Report

The annual report of the Pittsburgh Steel Company, Frick Building, Pittsburgh, which operates two blast furnaces and open-hearth steel works, rod and wire mills at Monessen, and hoop and band mills at Glassport, Pa., was issued last week. In commenting on present conditions in the steel trade President Wallace H. Rowe says in part:

In common with other concerns engaged in the steel business, your management has to report an unsatisfactory result of operations for the fiscal year ended June 30, 1914. The net profits for this period were \$416,550.91, as compared with \$1,193,669.49 for the previous year. During the year the prices of all products manufactured by your company reached a very low level, probably the lowest level in 15 years, with the result that, while your company's output shows no great change compared with the previous year (the shipments for this year being 292,554 tons, against 306,377 tons the previous year), the margin of profit has been much smaller.

Again referring to the acquisition of certain iron-ore properties, you are now advised that since the closing of our fiscal year ended June 30, 1914, a large tonnage of ore has been shipped directly from your mines on the Cuyuna range in Minnesota to the company's blast furnaces at Monessen. The quality of this ore has proved highly satisfactory. During the year your company's plants have been fully maintained. All costs for maintenance and betterments have been charged to the cost of production, and your organization was never in better condition to handle a large volume of business, which it is hoped will soon develop.

In view of the outbreak of the European war, and the uncertainty as to the extent to which it would affect your company's business, your directors, at a meeting held August 12, 1914, decided that it was prudent to conserve the company's cash resources, and therefore, by unanimous vote, decided to defer payment of the dividend on the preferred stock, usually paid on September 1. The outlook for the company's business for the coming year, up to the time of the breaking out of the war, was excellent, and your management was looking forward to a large business, owing to the abundant crops, but it is too early to state whether and how it will be affected by the situation abroad, although at this time there is a good demand and inquiry for your company's products.

The earnings statement of the company for the year ended June 30, 1914, is as follows:

Sales	\$10,824,763.22
Add inventory of finished goods at end of period	1,310,251.54
	\$12,135,014.76
Deduct inventory of finished goods at beginning of period	1,143,931.72
	\$10,991,083.04
Materials used and cost of operations (including repairs and maintenance of plants)	9,277,784.69
	\$1,713,298.35
Deduct selling and general expenses	1,128,298.84
	\$544,999.51
Add interest and miscellaneous income	73,271.18
	\$618,270.69
Deduct interest charges	201,719.78
Net earnings	\$416,550.91

The balance sheet as of June 30, 1914, is as follows:

Assets	
Real estate, buildings, plant and machinery	\$18,534,421.51
Stock of subsidiary companies	419,000.00
Patent rights (not valued)	
Cash	1,137,546.44
Notes receivable	53,978.87
Accounts receivable (net)	2,539,156.85
Finished products, raw materials and supplies on hand	3,225,641.88
Deferred: Prepaid charges	43,866.49
Total	\$25,953,612.04
Liabilities	
Preferred stock	\$10,500,000.00
Common stock	7,000,000.00
Bills payable	3,463,566.67
Accounts payable	1,797,964.27
Surplus	3,192,081.10
Total	\$25,953,612.04

In the assets above enumerated is not included the entire value of the iron ore properties of the company, located on the Cuyuna range in Minnesota, and which the State authorities recently assessed for taxation purposes at \$3,000,000. This property is now carried on the books of the company at the actual amount expended, namely, \$419,303.17.

Newark Foundrymen's Association

At its first meeting and dinner of this season, held October 7, the Newark Foundrymen's Association, Newark, N. J., was addressed by Leonard Peckitt, president Empire Steel & Iron Company, on "Blast Furnaces and the Manufacture of Pig Iron." Mr. Peckitt sketched the early history and construction of blast furnaces, their operation, the hot blast, early and present types of stoves, characteristics of ore, charcoal and coke iron, the various grades of pig iron, copper in pig iron and its effects, sand cast and machine cast pig iron, analysis versus judging from fracture, the carbon content of pig irons and its forms, the use of mill cinder, the use of scrap in the cupola, etc. The audience was keenly interested and gave the speaker a hearty vote of thanks.

It is the purpose of the new administration of the association, which is headed by H. P. Macdonald, of Sneed & Co., so to arrange the programmes of the meetings of this fall and winter that the members will be carried progressively from the making of pig iron to the intricacies of the latest foundry methods. Coke probably will be discussed at the next meeting.

In the course of the business following Mr. Peckitt's address, Arthur E. Barlow, Barlow Foundry Company, expressed his appreciation of a testimonial which had been presented to him on the occasion of his retirement as secretary of the association after many years of service. The memento, engrossed in colors, was bound in leather. An application for membership was received from Richard A. Crocker, Jr., Crocker Brothers, New York, and favorable action was taken upon it.

The Belfont Iron Works Company's furnace at Iron-ton, Ohio, was blown in October 5, after extensive repairs. It had been out of blast since December 23, 1913. The improvements consist of a new cast house, an electric crane, pump and 150-ton track scale.

OBITUARY

JOHN WESLEY BOILEAU, geologist and expert in coal lands, died at his home in Pittsburgh October 7, from a self-inflicted wound. He was injured in an accident some time ago and had since been melancholy. Mr. Boileau came into prominence several years ago when he instituted proceedings before the Interstate Commerce Commission which resulted in a reduction of 10 cents per ton in the coal freight rates between the Pittsburgh district and Lake ports. He was joined in the suit by the Pittsburgh Coal Company and other interests, but he prepared the great mass of data, with original maps and charts. To his efforts also was largely due the fact that the testing station of the United States Bureau of Mines was located in Pittsburgh. He was a member of the Duquesne Club, Oakmont Country Club, Pittsburgh Country Club, Engineers' Society of Western Pennsylvania and other organizations. He leaves a widow and two sons.

ANDREW J. COHEN, first vice-president of the Merchant & Evans Company, Philadelphia, and chairman of the metal committee of the National Hardware Association, died suddenly October 11 at the Hotel Knickerbocker, New York, following an attack of heart disease. He was born in Philadelphia, was a student at the Doctor Faries School and later attended the University of Pennsylvania. He leaves a widow and a daughter.

WILLIAM H. MASON, Battle Creek, Mich., died October 1, aged 72 years. He was connected with the M. Rumely Company, American Steam Pump Company, Citizens' Electric Company and Michigan Carton Company, and was prominent in civic and club life.

WILLIAM W. LOBDELL, president Lobdell Carwheel Company, Wilmington, Del., died October 10, aged 70 years. He was also a banker.

J. A. HEINSHEIMER, of the Columbia Facing Mills Company, Buffalo, N. Y., died October 2.

SPENCER VAN CLEVE, president Erie Foundry Company, Erie, Pa., died September 29.

E. Keeler Company's Fiftieth Anniversary

The E. Keeler Company, Williamsport, Pa., manufacturer of boilers, completed on Saturday, October 10, fifty years of corporate existence. On that day the shops were closed and the employees given a holiday. In the evening the company gave a banquet to its employees at which more than 300 were present. President C. La Rue Munson acted as toastmaster, and addresses were made by Vice-President Isaac Barton; Riley Allen, a director; Shop Superintendent Allison; J. W. Parker, manager of the Philadelphia office, and Ambrose B. Dean, manager of the New York office. These addresses brought out the interesting facts that the company has never closed its doors, never reduced the wages of the workmen, never had a strike nor a lock-out. The president read what he termed a roll of honor, which contained about a dozen names of employees who had served the company continuously from 18 to 38 years, there being several who have been with the company 30 years or more. Two of the founders of the company are still living and were present, namely, Isaac Barton and William B. Maitland. The company presented to each guest, as a souvenir, a paper-knife made of bronze, bearing a suitable inscription. From the banquet the participants went to the Opera House, which was chartered by the E. Keeler Company for the occasion.

A Washington dispatch states that counsel for D. E. Loewe & Co., Danbury, Conn., asked the Supreme Court October 13 for early disposition of their suit against 200 members of the Hatters' Union for \$240,000 under the anti-trust law for damages incurred in the famous Danbury hat strike. Damages asked are for treble the original amount. Thirty-four of the original defendants in the suit have died since 1905, the date of the beginning of the proceedings.

WAR AND FOREIGN TRADE

American Ships and South American Trade — Recent Export Developments

WASHINGTON, D. C., October 14, 1914.—The Fifth Pan-American Conference, scheduled to be held at Santiago, Chile, November 29, has been indefinitely postponed by the unanimous action of the executive committee of the Pan-American Union. The postponement is due to the European war which has produced a situation full of embarrassments for the leading South American countries. In addition, the leading officials of the principal South American governments find their time so fully occupied in meeting emergencies growing out of the great conflict abroad that it is not practicable to give adequate attention to the matters scheduled to come before the conference. The Chilean government has been asked to fix a new date for the conference, presumably after the restoration of peace.

While the Departments of State and Commerce will continue the work of preparing instructions for the American delegates to the conference, it has been found necessary to take up some of the subjects with a view to earlier results. The Department of Commerce, therefore, will refer certain of these subjects to the commercial attaches and special agents who have been assigned to the South American countries: Dr. Albert Hale to Argentina, Prof. Lincoln Hutchinson to Rio de Janeiro and A. I. Harrington to Lima, Peru. The particular matters first to be considered, in view of the possibility that action by Congress may be necessary, are the questions of transportation and the adequacy of that provision of the new currency law authorizing the establishment of branch banks in foreign countries. The President is of the opinion that the creation of a government-controlled corporation to purchase and operate merchant vessels, as is provided for in the pending Alexander bill, would be of great assistance to our South American trade. Shipping experts here, however, do not agree with him and assert that there is ample tonnage available for the South American trade, and that any attempt on the part of the federal government to go into the steamship business will deter private ship owners and capitalists from participating in this business. This whole subject will be very carefully investigated and the outcome will have much to do with determining the fate of the Alexander bill when Congress reconvenes.

W. L. C.

The Sewing-Machine Export Trade

Orders for American sewing machines for shipment to Europe were generally held up at the beginning of the war, and the general conditions that followed resulted practically in the suspension of shipments to South America. The shutting off of this heavy export trade not only seriously affected the plants of the sewing-machine manufacturers but also of foundries supplying castings for parts. In the past week or two a few small orders for foreign shipment have come out but the business is still light, and there is no truth in a report that has been circulated that a plant in Cleveland, Ohio, has received a large order for shipment abroad to make clothing for soldiers. At the time war was declared, one Cleveland company had a large lot of sewing machines in New York for shipment to Australia. It was held up for several weeks but has now been released. Another shipment of sewing machines was made to Australia on a German carrier about the time the war broke out. The vessel was captured by an English warship, but, it is stated, that arrangements have now been made for delivering the machines to the consignees.

Pittsburgh's Export Movement

A meeting of the Foreign Trade Commission, recently organized at Pittsburgh, was held in that city on Thursday, October 8. Recommendation was made to the executive committee to select a representative to go to Europe to seek trade for Pittsburgh manufacturers. If this representative is appointed, he will probably be

a member of the commission. J. Rogers Flannery, chairman of the commission, called attention to the fact that nearly \$400,000,000 worth of German imports into England had not only been cut off but prohibited and that England was anxious to supplement the goods formerly imported from Germany with American-made goods. Commissioners were of the opinion that the time was opportune to have Pittsburgh represented in England. It was also decided to make available several hundred copies of the commodity index prepared by the Pittsburgh Industrial Development Commission for English chambers of commerce and business concerns. This book classifies all commodities manufactured in the Pittsburgh district. W. C. Coffin, of the Jones & Laughlin Steel Company, suggested that the foreign trade commission issue a bulletin periodically in the interest of Pittsburgh and Pittsburgh manufacturers. This matter was referred to the executive committee.

Continental Iron Trade Conditions

The Swedish paper *Affärsvarlden*, dealing with the Swedish export of iron ore, states that in Germany the activity at the Rhenish-Westphalian iron works has been reduced to 50 or 60 per cent. of the normal. In the southwestern iron district in Lorraine the iron works are at a standstill. The Mannesmann Works are stated to be working at 33 per cent. of capacity. In Upper Silesia the supply of iron ore from Sweden has stopped for some time, as all the railroads have been fully engaged with military transport. It seems, however, doubtful from information received from other sources that the Rhenish-Westphalian works as a whole are running at 50 per cent. of capacity, although some may be doing so.

The bulk of the iron ore imported into Germany has previously been forwarded through Rotterdam and there transhipped and carried further on the Rhine. As this route at the present time is stopped the railroad authorities have now decided to reduce the freights for iron ore from Lübeck to Westphalia, and the imports will be directed via Lübeck. The reduced rates were put into force on August 28 last. The Rhine freights have gone up by 100 per cent.

The German rolling mills are said to be attempting to resume export for certain kinds of material, at least to Denmark, Switzerland, etc. The price of steel bars has risen from 85s. to 125s. per ton, and for other finished products the increase in price is on a corresponding scale. The coal syndicate has raised prices by 3 marks a ton.

At the general meeting of the German Pig Iron Syndicate held on September 11 it was reported that business was suffering seriously from the war and the consequent interruption of traffic. Many of the syndicate's customers had been obliged to close down their plants wholly or partly. On the outbreak of the war deliveries were stopped all round. During August the deliveries were mainly for war purposes, and amounted to about 22 per cent. of the allotments. It was decided to carry out all contracts for home requirements at the prices and on the conditions agreed upon before the war, except where special circumstances arising out of the present situation render this impossible. The price for new sales for delivery in the last quarter of the year was raised by 5 marks per ton as compared with the ante-war price, the reason given being the increased producing costs of the blast furnaces and the probability of increased freights.

In connection with the British government's declaration of hematite and magnetic iron ore to be "conditional contraband," the London Iron and Coal Trades Review says, it is interesting to note that according to Hall on "The Law of Naval Warfare," "conditional contraband" consists of "articles capable of being used either for peace or war . . . their contraband or innocent nature is contingent on the use to which they are put." The decision of the British government has led to some criticism in Sweden. The Stockholm *Dagblad* asserts that the Declaration of London, signed by England, states clearly and distinctly that iron ore must not be considered war contraband, not even conditionally. The decisions of international treaties and

agreements, the journal adds, are no longer respected, except when they coincide with the interest of those concerned.

Relations With South America

The following statement has been issued by Calvin W. Rice, secretary of the American Society of Mechanical Engineers, New York:

"The present situation seems to offer an opportunity to develop our cultural relations with South America through the medium of the Panama-Pacific Exposition and the Engineering Congress. The secretary of the society has been active for a number of years in trying to promote these relations. This year, for the first time, he has succeeded, and the United States has issued through its State Department the necessary formal invitations to the Governments of Central and South America, to attend a Pan-American Scientific Congress, to be held in Washington in October, 1915. It is expected that the national engineering societies will be invited to assist the Government in the conduct of this congress."

Export Notes

Jordi & Ymbert, Barcelona, Spain, are inquiring for names of American manufacturers of wire rope, perforated metals and safety lamps for mines.

A telegram from the American Consulate General at Moscow to the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, says: "Reduced freight rates will be granted to American imports via Vladivostok. Extra low rates (will be granted) for American tin, nickel, copper, aluminum, zinc and medicated cotton."

Exports from New York, exclusive of specie, in the week ending October 10 show a decided improvement over the figures of the preceding week, being \$17,512,914, compared with \$13,270,865 the week before, and \$20,032,132 the week before that. In the corresponding week a year ago the exports were only \$13,121,933. Exports to date for this year are \$670,837,494, compared with \$691,848,004 the same period of 1913. Exports of domestics and cotton duck from New York last week were valued at \$629,680, the heaviest exports of these goods in any one week for a long time. The week before these exports had a value of only \$136,445, and the week before that of \$464,155. The details of foodstuff exports for the first 10 days of October show that England and France, as well as neutral countries, were much heavier buyers in this market than in either of the two other preceding ten-day periods for which reports were made.

Thus far the export sales of wheat and flour from this year's crop are estimated at 120,000,000 to 140,000,000 bushels, or nearly one-half of the available surplus, estimated at 300,000,000 bushels. More than 90,000,000 bushels have already been actually exported. Taking these estimates to be correct, we have sold more wheat abroad in the past three months since harvest than we export in an average season of twelve months.

South American consuls-general to New York attended a luncheon given by the Members' Council of the Merchants' Association of New York at the Hotel Astor, Wednesday, October 14. The speakers were W. D. Kies, manager of the foreign trade department of the National City Bank; John F. Fowler, vice-president of W. R. Grace & Co., and Charles M. Pepper, formerly foreign trade adviser to the State Department.

France has been a large buyer of motor trucks in the United States in the past week. The greater part of the order, estimated at 1800 trucks, was divided among five manufacturing companies. The orders were largely placed in New York, after tests at the Bethlehem Steel Company's plant at South Bethlehem, Pa.

A Mercer, Pa., dispatch reports that an order has been placed with the Reznor Stove Company in that city for 50,000 sheet metal tent stoves to be used by the French army.

A New England machine-tool builder has received

a letter from a German representative, via Holland, stating that the German government had issued an edict prohibiting all shipments of machine tools and small tools from the country except by special permission. Mail communication with Germany has been resumed with comparatively little interruption.

About 400 leading manufacturers and business men of Pittsburgh listened to an address in the Fort Pitt Hotel in that city on Saturday, October 10, by John Barrett, director general of the Pan-American Union. The meeting was presided over by J. Rogers Flannery, chairman of the Foreign Development Commission, recently organized in Pittsburgh. Mr. Barrett opened his remarks with a careful statement of the manner in which the credit relations of the South American republics with the world had been shattered by the war, and said that American business men would find it necessary to assist in the readjustment of financial conditions here before they could hope to establish a sound trade relationship elsewhere.

Pittsburgh Manufacturers to Have a London Office

The Executive Committee of the Pittsburgh Foreign Trade Commission, Pittsburgh, Pa., has directed J. Rogers Flannery, chairman, to proceed at once to London, England, to take charge of a bureau which it will establish in that city for the securing of foreign trade by Pittsburgh manufacturers.

Pig-Iron Situation Unprecedented

Matthew Addy & Co., Cincinnati, in commenting on the pig-iron market, find in its extreme stagnation a ground of hope: "Furnaces have had so few orders recently that if the matter were not so serious it would be ridiculous. Buying has shrunk almost to the vanishing point. To the casual observer it would seem as if the consumers of iron had gone on a strike. An exactly similar condition is unprecedented. The fact of the matter is that melters of iron are so timid that they are afraid to take a chance, fearful if they buy to-day that to-morrow either prices will be lower or else that they will have no need of the iron. In the meantime the foundries are using up the iron in their yards or the iron on old orders. The very intensity of this stoppage of purchasing indicates that it cannot last long. Some iron is being melted, for the foundries are at least on a basis of 30 to 50 per cent. capacity, and the day will come presently when they will have to purchase; and the longer this period of quiet lasts the sharper will be the reaction."

The Fafnir Bearing Company, New Britain, Conn., announces that its selling arrangements with the Rhineland Machine Works Company, New York City, have been terminated and that hereafter Fafnir ball bearings will be marketed direct from the factory. D. D. Davis, formerly of the Rhineland Machine Works Company, will be in charge of the new sales organization. This change does not affect the friendly relations of the two companies. The New York office will continue as usual for the sale of Rhineland and R. B. F. bearings, but inquiries regarding Fafnir bearings will be referred to New Britain.

A Cleveland, Ohio, automobile manufacturer has just taken a large order for motor trucks for shipment to Europe. It is understood that the order is for 600 trucks and that they will be delivered in France. This order follows the shipment, by the same builder, of several smaller lots of motor trucks to European countries now engaged in war.

The plant of the American Steel Foundries, at Granite City, Ill., will close November 1, it is announced, unless business develops sufficiently in the meantime to justify keeping it in operation. It employs about 2000 men and is affected by the shortage in orders for railroad equipment.

Pittsburgh and Nearby Districts

The report that the Sharon Steel Hoop Company, Sharon, Pa., is operating its plant to full capacity, with orders ahead for several months, is incorrect. Officers of the company state that its business is extremely depressed, and orders now being received warrant but about 50 per cent. operation. The outlook for the near future is not regarded as bright.

The works of the American Steel Foundries at Sharon, Pa., closed down last week for lack of orders for an indefinite period.

The plant of the East Liverpool Foundry & Machine Company at East Liverpool, Ohio, is being remodeled preparatory to a resumption of operations about November 1. J. L. Murphy and others have taken over the plant, which has long been idle.

The Taylor Collieries Company, Clarksburg, W. Va., has been incorporated with \$100,000 capital stock by William A. Taylor, James M. Taylor, Newton F. Hawkins, and others, of Pittsburgh, Pa.

The Crossley Lead & Machine Company, Erie, Pa., has been incorporated by Thomas H. Carroll and Edward and C. D. Crossley with a capital stock of \$15,000.

The McKinney Mfg. Company, North Side, Pittsburgh, manufacturer of hinges, barn-door hangers and other metal specialties, has bought the patents and equipment for manufacturing the Glen folding steel door mats.

The report that the tin-plate plant of the N. & G. Taylor Company at Cumberland, Md., had resumed operations after a long shut down is partly incorrect. The only department that has been idle has been the black plate mills. They have resumed operations, and the entire plant is now running to nearly full capacity.

The plant of the Irvine Steel Forge Company, Irvine, Pa., which has been idle for about four weeks, has started up again, but not to full capacity. The company makes tool steel and soft steel forgings.

The National Roll & Foundry Company, Avonmore, Pa., is building two 24-in. stands three-high bar mills, and one 24-in. stand two-high bullhead, about 360 ft. of roller table, and one vertical bar shear, designed to cut four bars $1\frac{1}{4} \times 8$ in. at one time, for the Massillon Rolling Mill Company, Massillon, Ohio; also three 54-in. roller levelers for the Erie Foundry Company, Erie, Pa. It has just completed the shipment of three stands of 30-in. finishing mills, three stands of 30-in. roughing mills and two stands of 28-in. cold mills for the Follansbee Brothers Company, Follansbee, W. Va., and one 108-in. squaring shear. A number of orders are on hand for small shears and punches. Enough orders are on the books to keep the entire plant running full for several months.

The Standard Horse Shoe Nail Company, New Brighton, Pa., is making considerable shipments of its products to foreign countries.

The real estate and personal property of every kind of the Leetonia Steel Company, Leetonia, Ohio, will be offered at public sale at an early date. The order was made following the application of William H. Hepburn, receiver, but it provides that no bid of less than \$32,500 is to be considered. It is claimed that this amount is necessary to pay the liens and expenses of the receiver.

The puddling plant of the A. M. Byers Company at Girard, Ohio, which contains 88 puddling furnaces, has resumed operations in part after a shutdown of several weeks.

Panic economies and engineering problems, with special reference to the present industrial situation, are to be discussed at a meeting in New York City Tuesday evening, October 20, at 29 West Thirty-ninth street, held under the auspices of the American Society of Mechanical Engineers. Frederick A. Waldron, industrial engineer, will present the paper of the evening.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, will install a 1500 hp. steam power plant in connection with its new rolling mills, mention of which was made in *The Iron Age* of September 24.

Philadelphia Foundrymen's Association

A goodly representation of the local and nearby foundry trade was present at the regular monthly meeting of the Philadelphia Foundrymen's Association held at the Manufacturers' Club in that city, October 8. An address was given by Thellwell R. Coggeshall, superintendent of the mechanical schools of Girard College, Philadelphia, who with the aid of lantern slides took his audience through practically all departments of the college, although he laid particular stress on the mechanical departments. He also sketched its history and that of its founder, Stephen Girard. He described the college system and pointed to the fact that the graduates receive educational and mechanical knowledge which fits them as advanced apprentices in the foundry trade.

Referring to the trades instruction building, which is of substantial construction, Mr. Coggeshall said it contained means for practice in drafting, pattern-making and machine shop work, the shop for the last-named containing planing, shaping and milling machines, a good assortment of lathes and radial drilling machines, among other equipment. Another building is occupied as a foundry and forge shop, in which all the castings used in the institution are made, both large and small. Although the cupola in the foundry might be considered small, Mr. Coggeshall said that the volume of output was amazing. There also are facilities for melting brass, aluminum and other metals. A core oven, which is in service, was made entirely within the school, passing through the drafting room, pattern-shop and foundry to the stage of erection.

Mr. Coggeshall asked his audience to bear the graduates of the college in mind when they wanted young men. He said: "We are endeavoring to make molders, machinists, blacksmiths, draftsmen and carpenters and also to make men—men that you can use, men that other people have used and men that you are going to seek for. The reason I am here is that I may in some way convince you that you will find a better equipped boy at Girard than can be secured from any other place or any other line of training. They not only receive mechanical training and trade training, but they receive a line of academic work, shop mathematics, industrial reading and industrial chemistry, and you know how much these broaden a boy."

Prior to Mr. Coggeshall's address, President Thomas Devlin, as one of the association's delegates to the Atlantic Deep Waterways Association convention in New York, September 22 to 27, made a brief report on the work of the convention.

Secretary Howard Evans addressed the meeting on the general trade situation and expressed the belief that in the near future foundrymen will see a revival in business.

New Leases of Hill Iron Mines

The Tod-Stambaugh Company, Cleveland, Ohio, has leased from the trustees of the Great Northern Ore Properties the new Dean-Itasca mine at Buhl, Minn., formerly the Whiteside mine, and several other Mesaba range ore properties including the Morton and Eddy. The leases were taken in the name of the Dean Iron Company, which is owned and operated by the Tod-Stambaugh Company. The Dean-Itasca mine will begin its first shipping season next year. This mine is now being stripped, the stripping contract calling for its completion July 1, 1915.

At a meeting of the directors of the Cleveland Hardware Company, Cleveland, Ohio, October 8, three new members were added to the board of directors, these being long time employees of the company. The new directors are A. A. Gay, manager of the automobile sales department; W. H. Chase, manager of the carriage hardware sales department, and W. D. Lewis, purchasing agent. The placing of heads of departments in the directorate is a further extension of the company's policy of allowing department heads to become stockholders and having a joint management by the working stockholders, which was described in *The Iron Age* of July 2, 1914.

The Machinery Markets

The placing of orders for export in New England and in the Central West looms up big as compared with the light activity prevailing in other sections of the country. Despite more or less uncertainty as to exactly the amount of orders and the destination of the machines specified, there is no question but that the aggregate business runs into good figures. Engine lathes predominate in the sales, though grinding machines and automatics are called for also. Domestic trade continues dull everywhere. New York still awaits orders expected to emanate from war requirements. New England is experiencing a general betterment as a result of foreign demand. The volume of business in Detroit has been light, but there are evidences of busier times, as the automobile trade and building conditions are improving slowly. Both foreign orders and improved demand from the automobile industry are reported in Cleveland, where an improvement in miscellaneous demand is noted also. A large number of inquiries for lathes for export are scattered among manufacturers in Cincinnati and some good orders have been placed, although the demand for other types of machine tools is poor. The situation in Milwaukee is more encouraging, partly because of the resumption of some big industries, including the International Harvester Company plant in that city. Small electric motors are moving well in the Central South and machine tools better than was expected. Machinery dealers in Birmingham report a number of inquiries from saw mills along the coast who appear to believe the export business will revive. Machinery is in poor demand in Texas, but a betterment is looked for with the growth of better conditions in cotton. The St. Louis machine tool market is slightly improved in tone, but the aggregate of buying remains small. Signs of activity in the machinery trade are evident on the Pacific coast, where many shingle mills and small saw mills are being built.

New York

NEW YORK, October 14, 1914.

The large orders which salesmen in this territory expected to follow the much-talked of purchases of war materials in this country have not been received and the market continues quiet. There is much discussion of the big export orders placed with manufacturers in New England and the Central West for lathes and other machines, but local dealers and sales managers say they have had no part in the activity, and the question as to through what agency the orders were placed is repeatedly asked. A pleasing piece of information is that the New York Central Railroad received estimates last week for \$12,000 to \$15,000 worth of machine tools, this being the best bit of railroad purchasing in some time. The Ward Motor Vehicle Company is about ready to occupy its new plant in Mt. Vernon, for which several thousand dollars' worth of machine tools have been purchased.

The Brooklyn Foundry Company, 372 Greenpoint avenue, Brooklyn, N. Y., is rebuilding its plant recently destroyed by fire. Plans have not been completed; but wood-working tools, foundry equipment and electric motors of 3, 5, 10, and 25-hp. will be required. Andrew N. Petersen is president.

The Brooklyn Varnish Company, 35 Nostrand avenue, Brooklyn, N. Y., is building a two-story reinforced concrete factory extension, 25 x 100 ft., to cost about \$9000. A 40-hp. 18-in. x 12-ft., horizontal boiler and a 25-hp. horizontal engine will be installed. McGough & Hoey, 16 Court street, Brooklyn, are the contractors.

Plans have been prepared for a frame factory to be erected at Spruce street, near Jamaica avenue, Richmond Hill, L. I., for the John Donaldson Roman Stone Company, at a cost of \$5000.

The Rochester Paper Bottle Company, 93 Edinburgh street, Rochester, N. Y., has been incorporated by R. B. Culver and others to manufacture a patented paper bottle for milk, etc., and plans to establish a plant with a capacity of 108,000 bottles per day. Machinery will be installed to comply with growing needs. Actual operations will be started about January 1, when factory quarters will be acquired. R. B. Culver is president.

The Hudson River Novelty Company, Peekskill, N. Y., has filed articles of incorporation with a capital stock of \$50,000 to manufacture toys, ornaments, novelties, etc. J. S. Baker, G. E. McCoy and W. Lawson are the incorporators.

The Remington Paper & Power Company, Watertown, N. Y., with a capitalization of \$1,575,000, has been incorporated by L. Bittner, Brooklyn, N. Y.; N. B. Caswell, Gouverneur, N. Y., and M. S. Wilder, Watertown, O.

The Otis Elevator Company, Buffalo, is erecting a one-story brick addition to its plant on Grider street, East Delavan avenue and the New York Central Railroad.

The Porter Cable Machine Company, Syracuse, N. Y., has increased its capital stock from \$50,000 to \$100,000.

The plant of the Geneseo Foundry Company, Geneseo, N. Y., which was badly damaged by fire recently, is to be rebuilt at once.

The Taggart Paper Company, Watertown, N. Y., with a capital stock of \$1,000,000, has been incorporated to take over the plant and business of the company of the same name. G. T. and A. T. Sherman and J. V. Barron are the incorporators.

The Clipper Tool Company, Buffalo, of which Frank Parr is president, has purchased the factory property at 284 Mills street, consisting of an acre of land and four buildings. Extensive improvements are to be made.

The East Bethany Cold Storage Company's plant at Batavia, N. Y., a branch of the Leroy Cold Storage Company, was destroyed by fire last week with a loss of \$50,000. Plans for rebuilding are under way.

The Seaburg Mfg. Company, manufacturer of medicine cabinets, tabourets, etc., Jamestown, N. Y., of which Ernest Seaburg is president, has let the contract for the erection of a three-story and basement factory, 50 x 75 ft.

The Warren Curtis Mfg. Company, Corinth, N. Y., has been incorporated with a capital stock of \$500,000, to manufacture paper, wood pulp, etc. Warren Curtis, Jr., H. L. Curtis and A. S. Mayhew, are the incorporators.

The New Process Gear Corporation, Syracuse, N. Y., T. W. Meacham president, has let contracts for the erection of three factory buildings, three stories and basement each, to be added to its plant. The cost with equipment will be about \$100,000. Plans have been drawn by Day & Zimmerman, 611 Chestnut street, Philadelphia.

The O. K. Mfg. Company, Syracuse, N. Y., will erect a factory for the manufacture of office supplies, 80 x 170 ft., one story, to cost about \$25,000.

The New Era Furnace Company, Buffalo, has filed articles of incorporation with a capital stock of \$100,000 and will equip a plant for the manufacture of furnaces, boilers and heating appliances. Joseph Cook and Edwin L. Beebe, 401 Elmwood avenue, Buffalo, and G. S. Beebe, Silver Creek, N. Y., are the incorporators.

The Syracuse Milling Company, Syracuse, N. Y., will build an addition to its mill on the Erie Canal between Beach and Teall avenues.

Incorporation papers have been filed by Hall & Sons, Jewett, N. Y., for the manufacture of clay products, fire brick, fire clay, etc., by M. R. H. Bangs and F. H. Colgate, New York City, and E. H. Washburne, Cambridge, Mass.

Dunn & Sheridan, 1123 Broadway, New York City, have the general contract for the erection of a three-story mill for the Northern Iron Company, Real Estate Trust Building, Philadelphia, Pa.

The contract has been let and steel is being erected for a foundry building for the Continental Heater Corporation, Dunkirk, N. Y., to cost \$40,000.

New England

BOSTON, MASS., October 13, 1914.

The week has been of enormous importance to some of the New England machine-tool builders because of large orders received, presumably for shipment to Europe. This business consists mainly of engine lathes. Several of the works which specialize in this class of equipment find themselves with stocks practically wiped out, where ten days ago little immediate prospect of any considerable volume of sales was anticipated. These recent orders are not confined to lathes, but include the larger sizes of automatic and semi-automatic turning machines and also milling machines. Grinding machines have profited to some extent. The planer and shaper manufacturers have not benefitted materially by the business, which is directly the result of the war. The total of machinery that has been sold in the United States for shipment to foreign countries has already reached a large figure in money. It is a cash business which should have a stimulating effect on collections. Some shops are already busy, instead of being very dull as they had been for months before the war began. Others that have disposed of their stocks will now start up on a much greater percentage of production. The manufacturers of wood-working machinery are experiencing a similar revival. One large New England plant had been comfortably busy until the war caused the holding up of an important amount of shipments. These machines are now going forward and the better conditions of the early summer have returned. In other lines of machinery manufacture the exceptions from the prevailing apathy are by no means rare and are increasing in number. The effect on the foundries has been felt to some degree and the pig-iron merchants report a growing volume of inquiries, although some of this latter improvement is of course attributable to the prevailing low prices.

Referring again to the situation in the machine shops, the Boston dealers report the local demand to be very light. However, some local inquiries are out. Manufacturers are receiving more requests for information as to prices and delivery from users in other parts of the country than in this territory. While the New England lathe builders have received no word indicating the placing of the big order of the Bethlehem Steel Company, few of them expect to share in this business because they have none of the machines in stock. They have been told that in addition to these 40 20-in. machines, the Bethlehem people will soon have out a supplementary list.

Steam pump builders are doing a very good business. New England stove manufacturers are making little complaint. Their activity is evidenced by a rather free buying of iron. The cutting off of European competition is assisting them.

In the miscellaneous industries outside of the metal trades, some enormously large business is either already placed or will be placed immediately. Much of this comes from the efforts of the warring nations to supply their armies with suitable clothing. Very large quantities of army shoes will be made here. In one case the effort to secure the type of shoe adopted by one European nation failed because of the inability of the manufacturer to secure the necessary sort of thread. Its manufacture has been abandoned in this country with the change in the type of shoe almost universally adopted. But the European government decided that it must have the shoes regardless of its specifications, so the United States army shoe was adopted and will be turned out in very great quantities.

The cotton yarn manufacturers, who were very dull before the war and duller since, are now running practically full and propose to increase production still further in manufacturing the material from which enormous numbers of sweaters will be knitted. The knitting mills are equally busy producing the sweaters. While these garments are of cotton, they are fleece lined to give them the required warmth.

The influence of these and other similar improvements in individual industries will be widely felt in the resulting demand for raw materials, equipment and supplies.

Business men generally expect a most prosperous future. It is no exaggeration to say that the exception to this classification of opinion is not common.

The large orders for motor trucks booked by a number of American builders have already resulted in important contracts for such parts as chains and tires, and for some new equipment.

The Spencer Wire Company, Worcester, Mass., is planning the erection of two additional buildings. The new space will be occupied in a general expansion of various existing departments.

The Dane Machine Company, manufacturer of thermos bottles, Salem, Mass., has begun the erection of a factory, 45 x 100 ft., one story, of concrete.

Richard P. Power, Worcester, Mass., has purchased a tract of land on Albany street, where he plans the erection of a foundry building. He has been superintendent and general manager of the Wheeler Foundry Company, Worcester, for a number of years.

The Ayer Mfg. Company, Meriden, Conn., manufacturer of abrasive compositions and buffing wheels, is preparing to enlarge its factory to double the capacity.

The Union Metallic Cartridge Company, Bridgeport, Conn., will build an addition which will be located at Seaview avenue and Grant street.

The Chemical Paper Company, Holyoke, Mass., will build a large addition to its mill.

Gannon Brothers, Salem, Mass., will build a three-story factory of mill construction.

W. H. Gove, Salem, Mass., will erect a five-story brick factory, 50 x 225 ft.

The Berkshire Cotton Mfg. Company, Adams, Mass., has completed plans for the construction of an additional mill of large dimensions.

The Killingly Mfg. Company, Williamsville, Conn., a subsidiary of the Goodyear Tire & Rubber Company, will build a factory which will be used for making cotton duck for automobile tires.

Simon Goodman, 68-70 Ceylon street, Dorchester, Mass., has prepared plans for a machine shop, 40 x 62 ft., two stories.

Work has begun on the reported addition to the plant of C. Cowles & Co., New Haven, Conn., manufacturers of carriage and other hardware. The structure will be 42 x 80 ft., four stories and basement.

Philadelphia

PHILADELPHIA, PA., OCTOBER 12, 1914.

Smith, Drum & Co., 2503-2509 Coral street, Philadelphia, Pa., manufacturers of machinery for dyeing and finishing cloth, are building a one-story machine shop, 90 x 164 ft., which they will erect at Allegheny avenue and Lawrence street at a cost of \$15,000. They will move their plant to this location; but will not be in the market for additional machinery.

J. Howard Supplee, Lancaster Pike, Rosemont, Pa., has had plans prepared for a two-story reinforced concrete garage, 60 x 200 ft., to cost about \$25,000. Estimates are now being taken for sub-bids.

The Scranton Gas Company, 115 Wyoming avenue, Scranton, Pa., has awarded the contract for a brick and concrete garage, one and one-half stories, to cost about \$20,000.

The Eastwick Motor Company, 120-126 West North avenue, Baltimore, Md., has let the contract for a garage and service building, three stories, 20 x 100 ft., and one story, 60 x 100 ft.

Charles A. Blatchely, engineer, Drexel Building, Philadelphia, Pa., has drawn plans for a one-story brick and steel boiler house, 27 x 32 ft., for the Aberfoyle Mfg. Company, Chester, Pa. Two 400-hp. Edge Moor boilers will be installed. No other equipment is planned.

The City Council, Punxsutawney, Pa., has secured options on a water supply and has completed plans preliminary to the establishment of a municipal water plant and pumping station.

The town clerk, Upper Darby Township, Pa., will sell \$150,000 of sewer improvement bonds, November 3.

F. R. Clemens, borough clerk, West Berwick, Pa., will sell \$20,000 of sewer bonds November 3.

The Davis Milling Company, Norfolk, Va., will equip a corn and feed mill. Electric motors will be needed. The daily capacity of the plant will be 2500 bu.

Chicago

CHICAGO, ILL., OCTOBER 12, 1914.

The Bates Expanded Steel Truss Company, in which A. J. Bates, mechanical engineer, 208 South La Salle street, Chicago, is chiefly interested, is having plans prepared for a one-story plant, 120 x 180 ft., at Gary, Ind., to cost \$30,000. It has bought a 40-acre tract and will manufacture telegraph and telephone poles.

F. W. Jones is building a three-story brick factory, 50 x 75 ft., at 4237 Indiana avenue, Chicago, to cost \$8000.

P. H. Heffron is having plans completed for a public garage to be erected on Central street, Wilmette, Chicago. The building and equipment will cost \$30,000.

The Grand Trunk Western Railway has taken out a building permit for a one-story brick and concrete round

house at 4260 South Kedzie avenue, Chicago, to cost about \$87,000.

The Weldmayer Auto Garage Company is building a one-story garage at 5229 Kimbark avenue, Chicago, at a cost of \$12,000.

The Cheney Talking Machine Company, Chicago, has been incorporated with a capital of \$100,000 by J. M. Barnes, E. L. Howe, Louis K. Scotford, 6433 Harvard avenue, and others.

The Englewood Desk Company, 5822 Lowe avenue, Chicago, suffered a loss of \$30,000 through the burning of its plant.

The National Ribbon Inking Machine Company, Chicago, has been incorporated with a capital of \$20,000 by A. J. Mahler, 2210 South Park avenue, Kent F. Lockwood and George W. Johnson.

The Peoria Hydraulic Pump Company, Peoria, Ill., has been incorporated with a capital of \$20,000, to engage in the manufacture of pumping machinery, the organizers being O. N. Robertson, E. F. Crehore and C. W. Heyl.

The Marion Machine Mfg. Company, Marion Heights, Ill., has nearly completed the installation of machinery at its new wood-working shop. G. W. Morgan is president.

The Iowa Gate Company, Cedar Falls, Iowa, is making rapid progress with the construction of its new plant, the main building of which is to be 120 x 460 ft.

New machine shops are being erected by the Wisconsin Steel Company at its Hawkins Mine at Nashwauk, Minn.

The Sheet Metal Specialty Company, Goshen, Ind., has placed the contract covering the erection of a one-story factory building to be 40 x 200 ft.

The Northwestern Mfg. Company, Sioux City, Iowa, organized to manufacture concrete machinery with a capital of \$50,000, has been incorporated, by L. L. Stamm, H. K. Hansen, J. H. Lawrence and others.

The Upton Machine Company, St. Joseph, Michigan, has filed a notice of an increase in its capital stock from \$30,000 to \$75,000.

The Warren G. Bright Horseshoe Company, Streator, Ill., will move its plant to Muncie, Ind.

The Industrial Research Laboratory, Danville, Ill., has been incorporated with a capital stock of \$15,000 and will install equipment for developing special processes.

The Moline Electric Company, Moline, Ill., has been incorporated with a capital stock of \$15,000 by C. R. Wood, R. W. Larson and E. P. Meyers.

The Superior Wire Products Company, De Kalb, Ill., has increased its capital stock from \$8000 to \$15,000 for the purpose of increasing its manufacturing capacity.

The Chicago Compressed Gas Company, Clearing, Ill., has been incorporated with a capital stock of \$25,000 by Harry C. Austin, W. P. Thornton and H. P. Harding and will equip a compressor plant.

The Automatic Eagon Brake Company, Lawrenceville, Ill., has been incorporated with a capital stock of \$10,000 by O. E. Gillett, W. S. Titus and A. E. Hill, and will equip a factory.

The Automatic Wagon Brake Company, Lawrenceville, Ill., has been incorporated with a capital of \$10,000 to manufacture an improved type of vehicle brake. The organizers are O. E. Gillett, W. S. Titus and A. E. Hill.

Brookston, Minn., has voted \$6000 of bonds to erect and maintain a water and lighting plant.

The Manchester Biscuit Company, Sioux Falls, S. D., has awarded the contract for a five-story and basement addition to its factory, 91 x 119 ft., to cost about \$80,000.

Milwaukee

MILWAUKEE, WIS., October 12, 1914.

The situation is more encouraging than for some time because of the improvement in several lines which has given two important local industries an opportunity to resume normal operations and more. The International Harvester Company's Milwaukee works started operations with a full force and the Vilter Mfg. Company is adding several hundred operatives. The machine tool market continues quiet, with here and there a sale of one or two tools. Heavy machinery is dull and but few encouraging inquiries are coming in. Gas engine and farm implement people are well satisfied with business and are laying plans for a large production to meet the demand occasioned by the bumper crop of 1914. Structural interests complain at the lack of new business, little new construction going on or being planned at this time.

A cable order from New Zealand for a large refrigeration installation and several fine bookings for Corliss engines and ice machines from American interests have made it necessary for the Vilter Mfg. Company, Milwaukee, to immediately

add several hundred men to its force. The foundry and machine shop departments will be manned to full capacity at once. Shipments on the New Zealand order started Saturday, October 10. It has a number of good inquiries from South America as the result of its trade extension campaign and is looking forward to a busy winter season.

The Harley-Davidson Motor Company, Milwaukee, broke ground this week for a \$20,000 factory addition, to be devoted principally to the sheet metal work and assembly of sidecar bodies. Six months ago it completed work on several additions costing \$125,000. All the buildings are of reinforced concrete and the latest addition will afford 315,000 sq. ft. of floor space. At this time the company is employing 700 more workmen than a year ago and more than 150 will be added to man the new building. A sixth story will be added to factory No. 5 during the winter.

The Pacific Coast Condensed Milk Company, Seattle, Wash., has broken ground for its new plant at Oconomowoc, Wis., previously reported in prospect. The main building will be 260 x 250 ft., 2-stories, power plant, 40 x 160 ft., etc. Reinforced concrete construction is being employed.

The Fond du Lac Church Furnishing Company, Fond du Lac, Wis., has started work on an additional story to its main factory, 60 x 175 ft., for general cabinet work and finishing. A small list of wood-working machinery has been contracted for.

The Milwaukee Steel Foundry Company, Milwaukee, Wis., has been granted a permit to erect a one-story steel structure, 16 x 138 ft., at 157 Virginia street, to cost \$10,000.

The Milwaukee-Western Barrel Company, Milwaukee, has been organized with a capital stock of \$10,000 by Max and Samuel Fredman and Meyer Eronik, to manufacture wooden barrels and containers.

The West Bend Aluminum Company, West Bend, Wis., will increase the battery of buffing machines from six to nine. The drive is by individual electric motors throughout.

The Berkely-Fourness Company, organized recently by Madison capital, has established a factory at 619 Williamson street, Madison, Wis., for the production of die-castings and die-cast specialties, including bottle crates, coolers, automobile and locomotive headlight regulators and an improved lock-nut for railroad work.

J. N. Jersild, Neenah, Wis., has obtained all American rights to the manufacture and sale of a new type of fire escape for large buildings, designed in Denmark, and proposes to contract with an industry in Milwaukee or other large city in Wisconsin for the manufacture of the structure until arrangements can be made for home manufacture.

Indianapolis

INDIANAPOLIS, IND., October 12, 1914.

The H-K Toy & Novelty Company has been incorporated in this city with \$60,000 capital stock by J. W. Knipp, W. A. Huston and H. W. Klausman, to manufacture novelties.

The Hartman Top Company has been incorporated here with \$5000 capital stock to manufacture auto and other vehicle tops and accessories. The directors are Lawrence C. R. H. and L. M. Hartman.

Robert H. Hassler, Inc., Indianapolis, has been incorporated with \$10,000 capital stock to manufacture automobile parts. The directors are R. H. Hassler, G. F. Mull and C. D. Hoyt.

The B & B Mfg. Company, Indianapolis, has been incorporated with \$5000 capital stock by W. I. Ballentine, A. S. Bixby and W. J. Blackmore, to manufacture foundry molding machines.

The Marion Association of Commerce has been organized at Marion, Ind., to promote commercial and manufacturing business. Among those interested are J. O. Batcher, C. Price and Charles R. Bennett.

The Sheet Metal Specialty Company, Goshen, Ind., has let the contract for an extension to its factory, 40 by 200 ft.

The Fuson Adjustable Shade Company, Logansport, Ind., has been incorporated with \$10,000 capital stock to manufacture window shades. The directors are Frank, Raymond and V. A. Fuson.

The K-D Cabinet Company, Richmond, Ind., has increased its capital stock from \$30,000 to \$50,000.

The Waterworks Company, Ferdinand, Ind., has been incorporated with \$21,000 capital stock, to supply water, heat, light and power. W. R. Sauer, J. A. Sonderman and H. Bolte are the organizers.

The Tri-State Casket Company, Kendallville, Ind., has been incorporated with \$20,000 capital stock, to manufacture burial caskets. G. L. Snyder, E. G. Autenrieth and H. C. Voelke are among the directors.

The Greene County Brick & Tile Company, Tulip, Ind., has been incorporated with \$50,000 capital stock by George W. Cotton, Marshall Cotton and A. Carlton Snodgrass.

The Gary Brick & Tile Company, Gary, Ind., has been incorporated by F. Enwecke, A. Wende and W. Neumeister, with \$60,000 capital stock, to manufacture brick and tile.

The Dietrich Mfg. Company, South Bend Ind., has been incorporated to manufacture railway appliances. The directors are E. C. Dietrich, C. W. Bliss and G. M. Hewitt.

The Akron & Laketon Utility Company, Akron, Ind., has been incorporated with \$25,000 capital stock, to furnish, light, heat and power. The directors are V. J. Lidecker, W. K. Stevenson and C. W. Harter.

The Safety Shredder Company, Newcastle, Ind., has been dissolved.

Cleveland

CLEVELAND, OHIO, October 12, 1914.

An improved demand from the automobile trade, together with the placing of some foreign orders, has tended to help the local manufacturing situation. Additional orders for motor trucks for war purposes have come to Cleveland manufacturers, and as a result, one of the local plants is being operated night and day to get out a rush order for 40 trucks. New inquiries of a like nature are pending. Automobile plants in the Central West are becoming busy and a good volume of orders for automobile parts is coming out. One of the largest makers of automobile forgings in this city is running its plant at full capacity. Makers of automobile frames are fairly well filled with work, having more orders on their books than at this time a year ago. Some of the makers of automobile frames are turning their attention to the foreign trade, and expect to book orders from England, which has been securing its automobile frames largely from Belgium. In machine tool lines the market is still dull. An improvement in scattering orders for single tools is noted. Little foreign demand has developed. No lists of any size are being figured on, but an Ohio manufacturer expects to have a list out shortly for about a dozen machines. There is no buying by the railroads.

The Parish & Bingham Company, Cleveland, maker of automobile frames, has commenced operations in its new West Side plant. It will keep its old plant in operation until about January 1, when it will move its offices to the new quarters. It is a one-story structure, 100 x 900 ft., and gives the company about one-third greater capacity than at present.

The National Lamp Works, Cleveland, has about completed the last unit of its group of factory buildings off Ivanhoe road, East Cleveland. It includes a sheet-metal-working factory for the manufacture of light fixtures, a glass-making plant and power plant. Two gas producers for the two glass furnaces are being installed by the Smith Gas Power Company, New Lexington, Ohio.

The Ohio File Renewing Company, formerly located in Niles, Ohio, is now located in the former Comey and Johnson Building on West Seventy-seventh street, this city. W. H. Draper is president, and George H. Baren, secretary and treasurer.

The Willard Storage Battery Company, Cleveland, will erect a \$20,000 shop on East 131st street.

The Flanner Water Tube Boiler Company, Akron, Ohio, has been incorporated with a capital stock of \$40,000 to manufacture a new type of boiler patented by D. D. Flanner. R. B. Barder of the Biggs Boiler Company, J. K. Williams of the Williams Foundry & Machine Company, and others, are incorporators.

The Serpentine Heater Company, Marion, Ohio, has been incorporated with a capital stock of \$25,000 by J. Lee Shaw, J. B. Krink, and others, to place on the market a house-heating furnace. It has built a plant which will soon be placed in operation.

The Acme Level Company, Toledo, Ohio, has been incorporated with a capital stock of \$15,000 by B. F. Culbertson, A. W. Hight, and others, to manufacture steel levels and squares.

The Champion Spark Plug Company, Toledo, Ohio, and the Jeffery-DeWitt Company, Detroit, Mich., have been consolidated and the latter plant is being moved to Toledo. The Champion plant has recently been enlarged by an addition that has provided 40,000 sq. ft. more floor space.

The Toledo Auto Tool Company, Toledo, Ohio, has been incorporated with a capital stock of \$30,000 by John C. Jones, M. D. Merrick, A. L. Allen, and others.

The Enterprise Aluminum Company, Massillon, Ohio, has been incorporated with a capital stock of \$50,000 to manufacture aluminum ware and other products. A. G. Fenwick, Joseph R. Immler, G. M. Thomas, and others, are incorporators.

The Meehan Boiler & Construction Company, Lowellville, Ohio, has increased its capital stock from \$25,000 to \$50,000.

Detroit

DETROIT, MICH., October 12, 1914.

A light volume of business is reported by local machinery merchants this week and no sales of importance were consummated. Inquiries continue steady but are mostly for single tools. There is some demand for good rebuilt machinery, both of small and heavy types. The automobile industry was thrown into almost a panic at the prospective tax on automobiles but the situation seems to have cleared up satisfactorily. Several inquiries for trucks have been received by local manufacturers and there is every evidence of increasing activity in this line of manufacture. Makers of accessories report a better volume of business. Conditions in building circles are slowly improving, money is becoming easier and a number of large projects which have been held up temporarily are expected to be reported shortly.

The Hyatt Roller Bearing Company, Detroit, is enlarging the capacity of its plant by the erection of an additional building, 75 x 200 ft., six stories and basement. New equipment will be installed. It has also acquired a site 160 x 165 ft. for an office building.

The Wilmo Company, Detroit, has been incorporated with a capital stock of \$100,000 by Ray B. Johnston, A. E. Rothstein and M. L. Fisher. It will deal in machinery.

Smith, Hinchman & Grylls, Detroit, architects, are asking for bids on machinery for installation in the municipal garbage reduction plant.

The Continental Motor Mfg. Company, Detroit, is making additions to its plant. The machine shop is being enlarged, and the capacity of the heat-treating, stamping and experimental departments is being increased. A garage will also be erected. The additions will house considerable new equipment.

The A. C. Knapp Company, Detroit, manufacturer of automobile tops, has acquired the plant of the Michigan Top Company and will operate both factories.

The Upton Machine Company, St. Joseph, Mich., has increased its capital stock from \$30,000 to \$75,000.

The Walker-Weiss Axle Company, Flint, Mich., has increased its capital stock from \$150,000 to \$300,000.

The Fremont Canning Company, Fremont, Mich., is having plans prepared for the rebuilding of its factory and the erection of a power plant.

J. J. Lampke, Bloomfield, N. J., is president of a company which will engage in the manufacture of automobiles at Mt. Pleasant, Mich. Construction of a factory will be started at once.

Joseph S. Noeker and others, Westphalia, Mich., will equip a small electric light plant.

Cincinnati

CINCINNATI, OHIO, OCTOBER 12, 1914.

There are a large number of lathe inquiries scattered among different manufacturers in this vicinity, and additional orders were booked during the past week. All of this business is from Europe. The total number of orders reported as received locally the past 30 days is doubtless out of proportion with the exact facts, and possibly some of the inquiries put out are duplicates, but the situation as far as the lathe builders are concerned is very encouraging. Machine tool people look for a repetition of the situation that existed during the Russo-Japanese war, except on a larger scale. During that period lathe manufacturers were rushed with orders, and milling machine plants were also kept busy. The demand for planers and shapers is very poor, although there are a few inquiries out, for the former, from domestic sources.

Several local jobbing foundries are now operating on full time, and all of them report some improvement in business.

At the Annual Automobile Show, held in Cincinnati last week, there was a record-breaking number of exhibitors, and everyone interviewed stated that their respective factories were busy. A few reported tentative plans under way for increasing the output of their plants as soon as the financial atmosphere cleared somewhat. If this is correct, a call for machinery from the automobile and auto-truck manufacturers may be booked for at no distant date.

It is reported that plans are under way for enlarging the plant of the United States Cast Iron Pipe & Foundry Company, Addyston, Ohio, a Cincinnati suburb. No details are yet available. The company's head office is in Burlington, N. J.

James Dumbacher, Avondale, Cincinnati, has had plans prepared for a two-story cold storage plant to be constructed at Emery and Shillito streets. The proposed structure will be 46 x 72 ft.

The Dayton Computing Scale Company, Dayton, Ohio, has

purchased the plant of the Hamilton Scale & Tank Company, Hamilton, Ohio, and expects to move the machinery to Dayton at an early date.

The Duly Mfg. Company, Dayton, Ohio, manufacturer of carpet sweepers and other specialties, has commenced the installation of machinery in its new five-story reinforced concrete factory.

The Columbus Railway, Power & Light Company, Columbus, Ohio, is increasing the capacity of its Gay street plant. It is understood that the necessary equipment has been purchased.

The Universal Tractor Mfg. Company, Columbus, Ohio, has been incorporated with \$100,000 capital stock by T. Q. Pickard, C. R. Hedges and others. Nothing is known as to manufacturing plans.

The Dayton Welding Company, Dayton, Ohio, will establish a plant at Springfield, Ohio. W. L. Blackwell is president.

Work has been started on the proposed six-story reinforced concrete power building being erected for E. L. Shuey, Springfield, Ohio.

The new addition to the plant of the Lagonda Mfg. Company, Springfield, Ohio, recently mentioned, is nearing completion and will be ready for the machinery within 30 days.

Frank Taylor, Springfield, Ohio, is interested in a new company to establish an automobile repair shop.

The Meehan Boiler & Construction Company, Lowellville, Ohio, has increased its capital stock from \$25,000 to \$50,000.

It is reported that the Maiwurm German Aluminum Company, Ashland, Ohio, contemplates enlarging its plant at an early date.

The Thompson Milling Company, Mansfield, Ohio, will remodel a flour mill, adding considerable new machinery.

The American Playground Device Company will move its plant from Indianapolis to Anderson, Ind., and will add equipment for increasing its capacity.

The Central South

LOUISVILLE, KY., October 12, 1914.

Business continues to drag with most of the manufacturers in this territory, though prospects are becoming more numerous. The success which the "buy-a-bale-of-cotton" movement is meeting suggests that the situation in the South will be greatly improved. Electrical machinery is in fair call, but most of the motors being sold are of small capacity. Machine tools are selling better than expected.

The Vulcan Works, Louisville, recently organized to manufacture a patented bander for use in printing plants, is equipping a shop at Thirtieth street and Southern avenue. A motor, drill-press, grinder, lathe and other machine tools will be needed. W. Watts is president.

The Ohio Valley Engineering Company, 415 Inter-Southern Building, Louisville, has been organized to sell contractors' machinery. Stephen Hunt is in charge.

The Susquemac Distillery Company, Milton, Ky., is installing additional boilers and making other improvements in its power plant and grain mill.

The Eminence Loose Leaf Tobacco Warehouse Company, Eminence, Ky., has let contracts for two prize-rooms, for which electric motors, presses and other equipment will be needed.

The Moorefield Oil & Gas Company is equipping a bottling plant at Parks Ferry, Ky., for which power and special equipment will be needed.

The Chesapeake & Ohio Railroad, Richmond, Va., will build shops of considerable magnitude at Lexington, Ky. The present facilities will be enlarged by the installation of additional wood and iron-working machinery.

Charles J. Livering has organized the Livering Mfg. Company, Eddyville, Ky., for the manufacture of a patented lifting jack, wire fence stretcher and tobacco prizer.

The East Kentucky Coal Company, Fisher Building, Chicago, will develop 2500 acres of coal lands at Richardson, Ky. It plans to install equipment for a daily capacity of 2000 tons. C. O. Gent is general manager.

W. D. Coleman, Brandenburg, Ky., plans to install an electric light plant. The electricity will be generated by water power.

H. H. Evans, LaCenter, Ky., is equipping a small electric light plant. A gasoline engine is the prime mover.

The White-King Motor Company, Henderson, Ky., has been organized with \$2500 capital stock and will equip an automobile repair shop. Larkin White should be addressed.

The W. G. Duncan Coal Company, Greenville, Ky., will

purchase equipment for a machine shop. Plans for the building are being completed by Joseph & Joseph, architects, Louisville.

Bright Brothers, Bloomington, Ind., will equip a repair shop in connection with an automobile garage which they are now building.

The Hermitage Spoke Company, Clifton road, Nashville, Tenn., is to build a plant. Power and wood-working machinery will be needed.

The Chattanooga Gas & Coal Products Company, James Building, Chattanooga, Tenn., is ready to purchase machinery for the coke and by-products plant which it is to equip. The cost of the plant is estimated at \$450,000. Lewis T. Wolfe is president.

Pulaski, Tenn., will erect a building for its electric light plant, and some new machinery may be installed.

John T. Walker, Rogersville, Tenn., is to rebuild the furniture factory and the planing mill which were recently destroyed by fire. He is in the market for a 25-hp. boiler and engine, and special wood-working machinery, including a cut-off saw, rip saw, jointer, sticker, matcher, resaw, bandsaw, tenoner, shaper, sander, sawmill, etc., besides transmission equipment. The latter will probably be equipped with roller bearings.

The Hillman Hydraulic Power Transmission Company, Manchester, Tenn., will increase its capitalization from \$100,000 to \$125,000 for the purpose of financing improvements, it is reported.

St. Louis

ST. LOUIS, MO., October 12, 1914.

A slight improvement of tone has been noted in the machine tool market, but the aggregate of business remains low, the buying done being only for imperative needs. Indications of anticipated buying are seen in the tentative inquiries which have been made in lines which are first affected by the needs of war. Other lines are likely to follow in later. Reports from the cotton sections show that buying of the staple is being done, but still in quantities far less than normal and at prices about 35 per cent. below normal. Exportations are beginning to be reported from points in the St. Louis territory and with this demand as well as the increasing mill demand, there should be a better financial situation in this section so far as new enterprises, extensions of equipment and replacements are concerned.

The Gregory Supply & Mfg. Company, St. Louis, has been incorporated with a capital stock of \$12,000 by G. F. Moore, A. E. Wright and S. F. Andrews, of the Manufacturers' Railway, St. Louis, to manufacture a smoke consuming device.

The Koehler-Woodruff Auto-Repair Company, St. Louis, has been incorporated with a capital stock of \$12,000 by F. J. Koehler, L. J. Woodruff and H. J. Kroeger, and will equip a repair plant, requiring some machine tools.

The D. R. Russell Engineering Company, St. Louis, has been incorporated with a capital stock of \$100,000 by Daniel R. Russell, D. D. Currie and W. C. Connett.

The One Minute Churn Company, St. Louis, has been incorporated with a capital stock of \$15,000 by S. E. Cole, V. A. Shores and M. T. Shores.

The Crane Ice & Cold Storage Company, Crane, Mo., of which C. F. Woodson and W. E. Montgomery are the proprietors, will build an electric light plant and also equip a 10-ton ice plant.

The city of Rolla, Mo., has voted \$12,000 in bonds for the increase of the capacity of its waterworks plant.

The St. Mary's Machine & Engine Company, St. Mary's, Ohio, has awarded a contract for buildings at St. Charles, Mo., whither it will remove, and is reported to plan the purchase of additional machine tools.

The St. Louis Metal Welding & Mfg. Company, St. Louis, incorporated by Leo F. Ganahl and others with a capital stock of \$150,000, will install equipment for bending, welding and flanging, and also for the general manufacture of automobile rims.

A cold storage and ice plant will be equipped at Carrollton, Mo., by J. E. Heban.

The Independence Ice & Cold Storage Company, Independence, Mo., has increased its capital stock from \$75,000 to \$100,000 and will install additional machinery to double its present capacity of 40 tons.

The St. Joseph Ice & Mfg. Company, St. Joseph, Mo., will install additional manufacturing capacity.

A glass factory, to be equipped at Joplin, Mo., is being planned by S. W. Campbell and others, Sapulpa, Okla.

The McComas Hydroelectric Power Company, Edgerton, Mo., will equip a hydroelectric plant, the machinery to cost about \$50,000. J. M. McComas should be addressed.

The Joplin Waterworks Company, Joplin, Mo., has plans for the expenditure of about \$15,000 in the extension of its plant.

Marshall, Mo., has authorized the expenditure of about \$2000 for an extension of its waterworks plant.

W. W. Sweptson, president of Drainage District No. 3, Crawfordsville, Ark., announces that about \$225,000 will be expended upon the work at once and that considerable equipment will be required.

The Arkansas Light & Power Company, Little Rock, Ark., has placed additional securities to the amount of \$1,000,000 to be expended in the improvement of various plants which it owns and will enlarge or improve.

Ft. Smith, Ark., has plans by H. H. Reed, city engineer, for an electric light plant in connection with the waterworks to cost about \$210,000.

The Southwestern Gas & Electric Company, Texarkana, Ark., will install turbo-generation equipment in its light and power plant to cost about \$70,000.

The Freeman-Smith Lumber Company, Millville, Ark., will rebuild its burned sawmill and boiler house.

The Butler Auto Company, Little Rock, Ark., will equip an automobile repair shop to cost about \$10,000.

The Williams Cooperage Company, Leslie, Ark., will install additional machinery at a cost of about \$15,000.

The Turner Handle Company, Marked Tree, Ark., will rebuild the plant which was recently burned.

C. C. Chumley, Beebe, Ark., is reported in the market for isolated equipment for electric and water supply purposes.

The Empire Cotton Oil Company, Guthrie, Okla., of which John Dean is president, will remodel its mill to 80 tons daily capacity.

An electric light plant, including power plant, will be installed at Jet, Okla., by J. A. Humrichouse, Carmen, Okla.

The Colonial Public Service Company, Headton, Okla., has been incorporated with a capital stock of \$16,000 by G. W. Jennings, Hervey Franklin, and others, and will establish a light and power plant.

The Oklahoma Iron Works, Bartlesville, Okla., has purchased an iron foundry and will enlarge its capacity and improve the equipment.

The Sand Springs Power, Light & Water Company, Box 128, Tulsa, Okla., will equip an electric plant. Two 500-hp. boilers, condensers, pumping machinery and 1250-kw. transformers, turbine generator, etc., are wanted.

J. H. Markham, Jr., Bartlesville, Okla., is reported as prepared to build an oil pipe line with pumping station.

F. A. Gillespie, Tulsa, Okla., is reported to have plans for the development of about 1500 hp. of hydroelectric current on Blue River near Tishomingo, Okla.

The Southwestern Mfg. Company, Oklahoma City, Okla., is reported in the market for positive type blowers for use on cupolas in a casting plant.

The Henry Maley Lumber Company, Yazoo City, Miss., will equip a hardwood manufacturing plant to cost about \$40,000.

A planing mill and wood-working plant will be equipped at Jackson, Miss., by the Chicago House Wrecking Company, with a daily capacity of 100,000 ft. of general mill work.

The Bellamy Lumber Company will rebuild its burned mill at Hickman, Miss.

Vicksburg, Miss., has rejected the bids for the equipment of its proposed waterworks and will readvertise. A. L. Dabney, Memphis, Tenn., is the engineer. The bids will include pumping plant, etc., of large capacity.

The Shreveport Welding & Vulcanizing Company, Shreveport, La., is in the market for machinery for building automobile tires and tubes.

Houma, La., will receive bids until November 6 on pumping equipment, direct-connected to electric motor, starter, etc., of a capacity to be 2000 gal. per min. against a head of 150 ft.

Bids will be opened November 15 by the Slidell District Supervisors, Lottie, La., for machinery required in connection with canal construction and pumping plant and also one ¼-yd. dipper dredge.

Melville, La., is receiving bids for an electric light plant of about 75 hp., \$15,000 in bonds having been authorized for the purpose.

The Crescent Machine & Mfg. Works, New Orleans, La., has acquired property and will enlarge its plant.

A plant for the manufacture of fertilizers and by-products from cotton seed oil will be erected at Gretna, La., by the Cudahy Packing Company, Chicago, Ill.

Gretna, La., has plans for the installation of an electric light and power plant to cost about \$30,000. The mayor should be addressed.

The Bunkie Ice Company, Bunkie, La., will expend about \$20,000 in the construction of an electric light and power plant. W. L. Thompson, Boyce, La., is the engineer.

Birmingham

BIRMINGHAM, ALA., October 12, 1914.

Machinery dealers report a number of inquiries from sawmills along the coast, who appear to believe the export business may revive; but few transactions have resulted. The demand from the mines is falling off. Business is off 25 per cent. as compared with this time last year.

The Southern Structural Steel Company, San Antonio, Tex., has purchased ground in Bessemer, Ala., and proposes to establish a plant for the manufacture of steel cells and cages. The capital stock is \$100,000. D. F. J. A. and G. L. Youngblood and W. M. Cornett are interested.

W. G. Burnett and L. H. Davis, High Point, N. C., have purchased a site in Birmingham and announce the early construction of a 50-ton ice plant. A company with \$100,000 capital stock is to be organized.

The Montgomery Cordage Company, Montgomery, Ala., will install machinery for the manufacture of cotton rope.

The Tuscaloosa Cooperage Company, Tuscaloosa, Ala., has let the contract to Turner & Smith to rebuild its recently burned plant. Machinery costing \$15,000 is being purchased.

The Johnson-Wikle Company, Atlanta, Ga., has been organized by Charles E. Johnson, E. I. Wikle, and others, with a capital stock of \$25,000 and will install machinery for the manufacture of printers' rollers.

The Florida Fertilizer & Oil Company, Tampa, Fla., has been incorporated by A. C. Roesch, Alexander Houston, and others, and will establish a plant with a capacity of 10,000 barrels of fish scrap and oil. Mill construction buildings will be erected and a deck built at a cost of \$20,000. The equipment will include boilers, dynamos for electric lighting, conveyors, pumps and condensers of 5000 to 10,000 gal. per min. capacity. Machinery bids will be opened November 15. W. A. Ervine, Tampa, Fla., is the construction engineer.

The Southern Roofing Company, 914 Franklin street, Tampa, Fla., of which J. T. Tucker is president, has been incorporated with a capital stock of \$100,000 and will install machinery to manufacture a reversible lock and surface tin shingles. The daily capacity is to be 50 squares.

The Kehoe Iron Works, Savannah, Ga., will remove its plant to the river front and make general improvements, including the erection of a concrete and steel building.

Texas

AUSTIN, TEXAS, October 10, 1914.

Comparatively few new manufacturing and other projects requiring the use of machinery are being undertaken in Texas. The cotton crop situation is slowly improving, and it is expected that business conditions will show a marked change for the better.

The Federal Government of Mexico has placed an order in the United States for additional machinery for the government cartridge plant in the city of Mexico. The capacity of the plant will be increased from 30,000 to 60,000 cartridges per day.

J. G. Fisher, Jr., Deming, N. M., and associates plan to develop a tract of land by means of irrigation. Several pumping plants will be installed upon shallow wells.

The Standard Roofing Company, Tulsa, Okla., has been granted a permit to do business in Texas, with headquarters at San Antonio.

The Western Gin Company, Ballinger, will rebuild its cotton gin recently destroyed by fire.

A. D. Riddle, Cotulla, has been granted a franchise by the City Council, Crystal City, for the construction of an electric light and power plant.

The Alamogordo Water & Power Company, Alamogordo, N. M., will install an engine and other equipment to its plant. The Fulton Iron Works, St. Louis, Mo., has the contract.

The Sunset Brick & Tile Company, Gonzales, will install a new 150-hp. engine in its brick and tile plant.

J. S. Drapekin, New Orleans, will construct a cold storage plant at Orange.

The Texas Sheet Iron & Culvert Works, Austin, has been organized here for the purpose of manufacturing sheet iron products. J. T. Booth is one of the principals.

The Southern Construction Company has been organized at San Antonio. George E. Reeder is a leading factor in the enterprise.

The Port Arthur Garage, Port Arthur, will put in a repair shop.

The Citizens Light & Water Company, Port Lavaca, recently organized, will construct a waterworks system and electric light plant. R. H. Hamilton is one of the owners.

The contract for the construction of a waterworks plant and distributing system for Livingston will soon be let by the City Council. Bonds amounting to \$25,000 have been issued for the purpose.

The Pacific Northwest

SEATTLE, WASH., October 6, 1914.

The machinery trade, although comparatively quiet, shows indications of renewed activity but this increase may not materialize until around the first of the new year. A considerable number of shingle mills and small saw mills are being built. The logging camps and larger saw mills, however, are operating with as small a crew as possible. Conditions in eastern Washington are excellent. The harvests are abundant and prices for these staples remain firm.

In Seattle figures for the building operations during the first nine months of this year exceed in point of valuation those of last year by \$2,617,030. For the first nine months of 1914 the total valuations were \$10,526,430, as compared with \$7,909,400 last year.

The Crown-Willamette Paper Company, Portland, Ore., has been incorporated with a capital stock of \$13,000,000, to take over properties of the Crown-Columbia Paper Company, and the Willamette Pulp & Paper Company, with plants at Camas, Wash., Oregon City, Ore., and Floriston, Cal., etc. It plans extensive improvements to the plants.

J. W. McDonnell, Seattle, will build a shingle mill at 1410 Fourteenth avenue, Northeast. The contract for buildings has been awarded to Curtis Brothers, 1220 Roy street.

F. H. Watson and H. Bundy, Edmonds, Wash., have purchased a site for a box factory. Plans are now in preparation.

The Eureka Lumber Company, Eureka, Mont., will immediately rebuild its plant recently destroyed by fire.

The Ione Lumber & Pole Company, Ione, Wash., will begin work on the construction of a planing mill.

The Seattle Suitcase Mfg. Company, Seattle, Wash., has been incorporated by Louis Kahn, Frank Kahn and Annie Kahn, with a capital stock of \$50,000. It plans to build a factory. Edward Von Tobel, Mutual Life Building, is attorney for the company.

The American Tramway & Fire Escape Company, Spokane, has been formed with a capital stock of \$250,000, by D. S. Burkhart, Jesse Payne, G. H. Weller, and C. C. Stinger.

The Cleanwhite Chemical Company, Eugene, Ore., has filed articles of incorporation, with a capital stock of \$150,000, with O. E. Lee, A. H. Hinkson, H. E. Owen, and A. M. Robinson, and will erect a factory for the manufacture of a cleaning compound.

The Government Standard Powder Company, Portland, Ore., will build a 10-ton powder plant near Ganby, Ore., according to R. W. Woods, the president.

J. O. Cavanaugh, Ione, Wash., is president of a company to build a sawmill. The mill will have a capacity of 100,000 ft. per day.

The Northwest Advertising Company, Seattle, recently incorporated by I. W. Dudley, R. W. Nevin, R. L. Dickinson, and others, has announced its intentions of building a \$100,000 factory, to manufacture an electrical device. A temporary factory has already been established at Howard avenue North and Aloha street and temporary offices in the Hoge Building.

The plant of the Pelican Bay Lumber Company, Klamath Falls, Ore., which was burned recently, is being rebuilt. The company has ordered machinery for a large box factory as well as a sawmill of 250,000 ft. daily capacity.

P. S. Lantzy, Spokane, Wash., is arranging for the construction of a flour mill and electric power plant at Peck, Idaho.

The Northwest Lead & Machine Company, Portland, of which W. T. Althoff is president, has installed equipment for the manufacture of lead pipe.

The Golden Arrow Development Company, operating near Goldfield, Nev., will install a pumping plant.

Eastern Canada

TORONTO, October 10, 1914.

The ratepayers of Smith's Falls, Ont., passed a bylaw to loan the Aluminum Castings Company, Ottawa, Ont., \$25,000. In return the company will erect a manufacturing plant there.

J. T. Stuart will construct a sawmill at Lakeside Gardens, Pembroke, Ont. The construction work will be started at once.

The Bedford Mfg. Company, manufacturer of agricultural tools, Bedford, Que., is rebuilding its plant which was destroyed by fire.

The Harris Machine & Motor Works, Ltd., Dartmouth, N. S., has been incorporated with a capital stock of \$10,000 to do iron and brass founding, etc.

The Nova Scotia Carriage & Motor Car Company, Ltd., Halifax, N. S., has been taken over by the Nova Scotia Carriages, Ltd., recently incorporated. The new company will confine itself exclusively to the manufacture of carriages.

The Town Council, Leamington, Ont., will make additions to the equipment of its waterworks plant. R. M. Selkirk is the town clerk.

The Watson Carriage Company will commence the construction of a factory on Murray and Friel streets, Ottawa, Ont., to cost \$15,000.

The City Council, Sydney, N. S., will receive bids until October 31 for furnishing one 2200-volt, three-phase, 60-cycle, turbine pump and 1 S. all-air priming pump. Plans and specifications may be seen at the office of Norman Hay, engineer, Sydney, and specifications may be seen at the office of MacLean Daily Reports, Ltd., Toronto, Ont.

The Smart Mfg. Company will construct a hardware manufacturing plant at Brockville, Ont., to cost \$50,000. J. D. Denise, Olean, N. Y., is the architect.

The Comfort Horseshoe Company, Ltd., Toronto, has been incorporated with a capital stock of \$15,000 by John Walker, Ernest L. Taylor, and others, to manufacture horseshoes, etc.

The Galt Brass Mfg. Company, Ltd., Galt, Ont., has been granted letters patent to increase its capital stock from \$40,000 to \$100,000; and to change its name to that of the Galt Brass Company, Ltd.

The Stromberg-Carlson Telephone Mfg. Company, of New York, capitalized at \$40,000, has been granted a charter in Ontario to manufacture electrical and mechanical appliances, etc., and has appointed Nathan W. Baldwin, Toronto, to be its attorney.

The Knight's Patents, Ltd., Montreal, has been incorporated with a capital stock of \$16,000 by Felix W. Hackett, D. B. Smith, and others, to manufacture tools, machines, etc.

Western Canada

WINNIPEG, MAN., October 7, 1914.

The Sidney Island Brick & Tile Company, Ltd., Victoria, B. C., has been incorporated with a capital stock of \$150,000 to manufacture brick, tile, terra cotta, etc.

The Easterbrook Milling Company, Ltd., Richmond, B. C., has been incorporated with a capital stock of \$30,000 to erect plants for the manufacture of flour, feed, etc.

Keely Brothers, Omaha, Neb., have established a temporary plant at Weyburn, Sask., for the manufacture of boilers, etc., and will later build a shop.

Announcement is made by the Brackman-Ker Milling Company, Vancouver, B. C., that operations will shortly be commenced on a grain elevator and warehouse to cost \$25,000 to replace the one recently destroyed by fire at New Westminster, B. C.

The Estevan Brick & Coal Company, Estevan, Sask., is making arrangements for the installation of new dies at its brick plant for the manufacture of hollow brick and other kinds of hollow ware.

A factory site has been secured at Estevan, Sask., by the Denison Fireproofing Company, Mason City, Iowa, and the construction of a hollow brick plant will be started immediately.

Plans are being prepared and bids will be called for another unit of the shipbuilding plant at Lynn Creek, for the Dominion Shipbuilding & Dry Dock Company, 14 Canada Life Building, North Vancouver, B. C. This contract will include a machine shop.

The Conotolite Marble Company, Edmonton, Alberta, has been formed for the manufacture of artificial marble, etc. H. E. Luhan, Highlands avenue, Edmonton, is one of the stockholders.

Watt & Gibson, Regina, Sask., will build a planing mill to cost \$15,000.

Government Purchases

WASHINGTON, D. C., OCTOBER 12, 1914.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, October 6, for supplies for the navy yards, as follows:

Schedule 7297

Class 91, Norfolk—Two 5-ton hydraulic cranes—Bid 74, \$1290; 329, \$2116; 334, \$1395 and \$1730; 337, \$875.

Schedule 7298, Steam Engineering

Class 101, Philadelphia—Four bench grinders—Bid 64, \$54.80; 72, \$65.25; 107, \$70; 112, \$74; 151, \$55.30; 168, informal; 172, \$60.22; 173, \$66.50; 312, \$61.50; 135, \$54; 356, \$59.84.

Class 102, Philadelphia—Two valve-reseating machines—Bid 108, \$102.50; 112, \$90; 125, \$90; 172, \$90; 173, \$90; 175, informal; 187, \$102.50; 189, \$90; 217, \$90; 295, \$90; 185, \$88.20; 355, \$90; 356, \$90.

Schedule 7299, Steam Engineering

Class 103, Pier No. 67, New York City—Two 5-ton single I-beam travelers—Bid 24, \$360; 37, \$423.50; 55, \$390; 124, \$410; 139, \$377; 150, \$469; 172, \$473.59; 173, \$420 and \$356; 250, \$550; 329, \$312.50; 185, \$433; 355, \$272.47.

Schedule 7300, Steam Engineering

Class 104, Norfolk—Two pipe-threading and cutting-off machines—Bid 44, \$2288.40; 48, \$2721.56; 107, \$1524; 108, \$1353; 110, \$1524 and \$1935; 160, \$1998.90; 172, \$1524.75; 173, \$2091 and \$1527.75; 177, \$3894; 217, \$1350; 294, \$1541.25; 298, \$1416; 185, \$1584; 355, \$1527.

The names of the bidders and the numbers under which they are designated in the above list, are as follows:

Bid 24, Brown Hoisting Machinery Company; 37, F. S. Banks & Co.; 44, W. B. Covell Company; 48, Crane Company; 55, Chisholm & Moore Mfg. Company; 64, Cincinnati Electrical Tool Company; 72, James Clark, Jr., Electric Company; 74, Camden Iron Works; 107, E. L. Frazier; 108, Frevert Machinery Company; 110, Fairbanks Company; 112, Fairbanks Company; 124, Charles H. Graff; 125, R. W. Geldart; 135, E. F. Henson & Co.; 139, Hill, Clarke & Co.; 150, Hoisting Machinery Company; 151, Holtzer-Cabot Electric Company; 160, Jarici Mfg. Company; 168, Keystone Grinder & Mfg. Company; 172, Knickerbocker Supply Company; 173, Kemp Machinery Company; 175, Levitte Machine Company; 177, Landis Machine Company; 185, Manning, Maxwell & Moore; 187, McArdle & Cooney; 189, Montgomery & Co.; 217, D. Nast Machinery Company; 250, Pawling & Harnischfeger; 295, R. B. Sherman; 298, Swind Machinery Company; 312, U. S. Electrical Tool Company; 329, Whiting Foundry Equipment Company; 334, William H. Wood; 337, Watson-Stillman Company; 355 Manhattan Supply Company; 356, Manufacturers' Agency & Sales Company.

Trade Publications

Pneumatic Tools.—Ingersoll-Rand Company, 11 Broadway, New York City. Three bulletins. The first, No. 4033, gives general description and specifications for the Little Tugger hoist for use in mines, manufacturing and power plants, foundries and railroad shops, where a light, portable hoist is required. No. 8013 is devoted to a line of chipping, calking and scaling hammers, which are made in seven sizes. A reciprocating pneumatic drill is illustrated and described in the third, No. 8207, superseding No. 8107. Illustrated descriptions of the drill, which is equipped throughout with roller bearings, and the hoist appeared in *The Iron Age*, January 22 and September 3, 1914, respectively.

Metal Working Machinery.—Armstrong-Blum Mfg. Company, 339 North Francisco avenue, Chicago, Ill. Catalogue No. 3. Refers to a line of metal working machinery that includes automatic high speed and hack sawing, punching, shearing and portable grinding machines and drilling machine vises. A separate page is given to each of the different machines covered and illustrations and brief descriptions of each are presented. An illustrated description of the high speed sawing machine with automatic stock feed appeared in *The Iron Age*, June 1, 1911.

Electric Hoists and Monorail Cranes.—Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth street, New York City. Bulletins Nos. 906 and 48,700. The first is devoted to electric hoists of various types, designed to supply lifting and carrying devices between the hand chain block and the large traveling crane. The bulletin consists almost entirely of engravings of hoists of different types ranging in capacity from $\frac{1}{2}$ to 6 tons. The second bulletin illustrates and describes electric monorail cranes, which are built in several styles. Each particular

type is described at some length, with a view of the crane and a dimension diagram to supplement the text matter. A number of engravings showing the cranes in use in automobile plants, locomotive works, a pipe plant, a machine shop and steel works are included.

Turbine Pumping Machinery.—Lea-Courtenay Company, 90 West street, New York. Bulletin L. Contains an illustrated description of the company's line of double-suction multi-stage turbine pumps.

Turbo Undergrate Blowers.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Circular. Calls attention to a turbine-driven blower for supplying draft to boilers. An illustration of the blower is presented, together with a brief account of two cases in which increased boiler capacity was secured by the installation of the blower. One of the features of the set is that it may be arranged to respond automatically to all demands for increased steam.

Chains and Slings.—William E. Volz, 126 Liberty street, New York City. Wall hanger. Contains data on the care of chains and the prevention of accidents. In addition to the precautions to be observed in the use of chains and slings, a table of working loads is presented, together with a diagram showing the reduction in the load that can be lifted by a sling as the angle between the legs increases. Mention is also made of a chain adjuster which will shorten the chain by one or any desired number of links.

Overhead Tramrail Equipment.—Whiting Foundry Equipment Company, Harvey, Ill. Catalogue No. 111, superseding No. 102. Illustrates and describes a line of overhead tramrail equipment, including trolleys of various types, clamps, hangers, splices, switches, turntables, core carriers, casting trays, sand buckets and trolley ladles. A number of views of installations of equipment are included.

Tube Cleaners.—Roto Company, Hartford, Conn. Catalogues Nos. 40, 41, 42, 43, 44 and 48. The first pertains to the types and uses of the cleaners while the others embody illustrations and descriptions of boiler tube cleaners driven by air, steam or water and the cutter heads used in connection with them and locomotive arch and condenser tube cleaners that are driven by air or steam. In all of the catalogues the illustrations not only show the external appearance of the various cleaners, but also give some idea of the internal construction.

Appliances for Burning Fuel Oil.—Tate, Jones & Co., Empire Building, Pittsburgh, Pa. Catalogue. Lists the economies of oil for fuel and gives some results of comparative tests that have been made of coal and oil for steam production. The advantages of oil fuel for furnaces are briefly discussed together with concise statements of actual results in various kinds of furnaces, the text being accompanied by a number of illustrations of furnaces. A list of types of furnaces and industries in which an oil burner has been used are presented with brief illustrated descriptions of the various styles of burners. Mention is also made of a number of systems for pumping, heating and regulating the flow of oil to the burners.

Cast-Iron Pulleys, Flue Cleaners and Polishing and Grinding Machines.—Winfield H. Smith, Buffalo, N. Y. Circular and two leaflets. The first gives general description with specifications for a line of grinding and polishing machines which are designed for use on benches for handling small work. One of the leaflets is devoted to a line of cast-iron grooved pulleys, which are made in diameters ranging from 1 to 12 in., while the other illustrates and describes briefly a flue cleaner that has a series of irregularly shaped knives for shaving off the carbon from the tube surfaces. This cleaner is made in five sizes for tubes ranging from 2 to 4 in. in diameter.

Recording and Indicating Instruments.—Schaeffer & Budenberg Mfg. Company, 963 Kent avenue, Brooklyn, N. Y. Pamphlet. Relates to the general line of recording and indicating instruments made by this company which includes thermometers, gauges, tachometers, counters, gauge testers, etc. Illustrations and brief descriptions of each are presented, with a reference to the catalogue in which they are described more fully.

Pumps.—Blakeslee Mfg. Company, DuQuoin, Ill. Two booklets. The first, No. 6, treats of a jet pump for raising water to moderate heights in mills, mines, quarries, factories, etc. The various types of pumps are illustrated with brief specification tables and directions for erecting and operating the pump are included, together with views of suggested installation schemes. The other booklet shows a line of single-cylinder steam pumps for boiler and tank service. Illustrations of the pumps are presented, together with tables of specifications on the facing pages. Views of the company's vacuum pump for handling water of condensation in various locations are included.

